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JOURNAL OF BROADCASTING

SUMMER 1960

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CONTENTS

ISSUES IN BROADCASTING

History, *Editorial* 189

Space-Satellite Broadcasting: Threat or Promise?
Dallas W. Smythe 191

The Evolution of Television: 1927-1943 199

LAW OF BROADCASTING

Legal Restrictions on Use of Program Materials,
Walter B. Emery 241

RESEARCH IN BROADCASTING

Reaction Profiles: Studies of Methodology,
Samuel L. Becker 253

The Structure and Content of Music Continuity,
Edward W. Borgers and Allen E. Koenig . . . 269

LITERATURE OF BROADCASTING

Books in Review 280

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The JOURNAL OF BROADCASTING welcomes the submission of articles and reviews from all sources. Attention is called to the suggestions for the preparation of manuscripts appearing on the last two pages of the Winter 1959-1960 issue, Volume IV, Number 1.

Manuscripts, books for review, and editorial and business correspondence should be addressed to the Editor, JOURNAL OF BROADCASTING, University of Southern California, University Park, Los Angeles 7, California.

AUG 26 1960

HISTORY

A CULTURE, a civilization or an institution is built upon the remains of its predecessors. It is the ability to profit from our ancestor's mistakes that has enabled the human race to progress so far, so fast. A culture or an institution that loses its roots in the past, that throws away or never collects its history, is terribly weakened in its competition with other cultures or institutions.

This is a grandiloquent way to start an editorial about broadcasting history. Yet, if we acknowledge the unquestioned importance of the broadcast media in our society today, we should also acknowledge their history.

This has not been done. We have neither adequately gathered the history of broadcasting nor acknowledged its importance. Less than 40 years after the event we still argue which was the "oldest" radio station, and we have allowed the names of the founders of radio broadcasting to fade from memory.

Although there are some excellent books on broadcasting history, all too often we must resort to inaccurate biographies or perfunctory introductions to production textbooks for enlightenment. The Broadcast Pioneers organization and several academic groups have labored to settle questions of import in broadcast history, but cannot do the job alone.

Resting within the files of broadcasting stations and their personnel are reams of data from which the necessary volumes may be constructed. Although often faded and crumbled, notes, official reports, memoranda and press releases can offer insights into many problems of the present and future. A successful program idea from the past may always be "milked" again; those interested in TV allocations have the feeling that the same problems and arguments are repeated many times, in a seemingly endless cycle; the current arguments over pay-TV remind us of similar arguments over the financial support of radio in the 1920's. In a few years, many of the necessary records will be physically and mentally consigned to oblivion, unless preserved for use within some form of library.

Even more tragic is the loss of mental records. Within the next decade the actuarial tables tell us that many of the men who pioneered broadcasting in America will pass on. When they go, what they have laborously learned will often go with them. The Oral History Project at Columbia University has recorded on tape all too few interviews with these pioneers, some of which were published in *American Heritage* a few years ago. This is a particularly appropriate way of preserving radio history.

One of the greatest problems in historical research in broadcasting is the relative scarcity of an objective viewpoint. We have on our shelves books describing the development of television from the sharply opposing viewpoints of RCA, CBS, Farnsworth and Baird. To find the one source where many of the opposing viewpoints have been reconciled in the crucible of official hearings, the almost forgotten pages of early FRC and FCC *Annual Reports* have been abstracted in order to present what might be called the only relatively complete, official, cautious and impartial history of television from 1927 to 1943. This panorama of television shows not only the development of TV, but also holds a mirror to a surprising number of current problems, ranging from allocations to programming.

It should be remembered that the events of today will be the history of tomorrow—if we can but select what is important from the welter of such events. It is for this reason—to get a jump on tomorrow's history—that we are presenting Dallas Smythe's provocative article on space satellite broadcasting in these pages.

We should all devote a little time and effort to the preservation of the fast-disappearing, irreplaceable records of broadcasting. In some cases, publication in the JOURNAL or other periodicals is indicated. In other cases, books may result. In the majority of cases data should be collected, preserved and catalogued in an accessible place (such as a university library) until it can be meshed with other data. This is a task in which every broadcaster, every teacher and student of broadcasting, can willingly join with a firm feeling of accomplishment.

SPACE-SATELLITE BROADCASTING: THREAT OR PROMISE?

By Dallas W. Smythe

When discussion of earth orbital satellites first left the pages of science fiction magazines and "became respectable," the use of these devices for relaying of television programs was first seriously suggested. Today, the future is so close upon us that there exists a recent Congressional Report with the title, Satellites for World Communication.

Coupled with the world-wide shortage of frequencies, the development of space satellites for broadcasting purposes could cause tremendous changes in the current systems of domestic broadcasting. Even though they will be first used for point-to-point communication rather than broadcasting, the means by which such satellites will be regulated may well become of as much importance to the broadcaster as the NARBA and similar agreements are today.

Dr. Smythe, former head of the economics section of the FCC, is Research Professor in the Institute of Communications Research at the University of Illinois. The JOURNAL *gratefully acknowledges the permission of the* Illinois Business Review *of the Bureau of Economic and Business Research at the University of Illinois to print this article.*

RECENT technical advances have opened up the prospect of a vast increase in international broadcasting and point-to-point communications through the use of space satellites. This is no longer in the realm of science fiction. The capability now exists in the United States and in the Soviet Union for relaying communications from space satellites to people all over the world.

However, the world is quite unprepared for this development. No provision has been made to reach international agreement on the use of this new capability. Its utilization by the individual countries in the absence of a prior agreement on how it is to be used carries the threat of chaos in the air waves and of heightened tension in international relations.

The Nature of the Threat

Serious international problems arising out of the use of the air waves for communications already exist. One is the growing competition for frequencies. Former Commissioner

E. M. Webster of the Federal Communications Commission has characterized this as follows:

> The extreme excess of the demand for frequencies in the post-war world over the available supply has now made virtually all countries *competitors* for frequencies. This has enormously complicated telecommunications negotiations from the time of the first post-war conference at Atlantic City in 1947 . . .
>
> New empires can be built in the radio frequency field just as they can in any other field. It is perhaps significant to note here that when the Russians recently walked out of the Provisional Frequency Board meeting in Geneva, . . . they accused the United States of "expansionist tendencies," . . . trying to use its influence to take all and to leave the other fellow nothing. It is indeed unfortunate that the situation among our own government and industrial users parallels this so closely: each fellow tries to get all he can and then accuses the other fellow of leaving him nothing.

The military services press for greater allocations of the radio spectrum for their point-to-point communications, as do industrial and shipping interests. Scientists complain of inadequate provision of frequencies for astronomical and other space research.

Closely related to the problem of frequency allocation is that of the use to be made of frequencies. In the absence of control over use, frequencies assigned to countries for international broadcasting have often been used for aggressive propaganda purposes. The League of Nations did adopt a set of principles in 1938 prohibiting broadcasts "of such a character as to incite the population of any territory to acts incompatible with internal order or security" and emphasizing the importance of ensuring the "accuracy" of broadcast information concerning international relations. However, these principles have not been applied. In the years since World War II the systematic use of aggressive propaganda broadcasting to other countries, with its concomitant practice of jamming, has been one of the major sources of tension in the cold war.

Inadequate transmitting, receiving, and other broadcasting facilities in the underdeveloped countries may be said to be another international problem in the same sense that the economic and social development of these countries is an international problem. Some 117 countries, with 58 percent of the world's population, have less than 5 radio receivers per 100 inhabitants. Few countries in Africa have as much as 1 radio per 100 persons, Asia is almost as poorly equipped, and much of Central and South America is inadequately supplied. These conditions prevent effective utilization of broadcasting for educational and informational purposes, although it clearly has advantages over other media in areas where illiteracy is high, transportation is poor, and foreign exchange is scarce. So far as the obstacles to the use of broadcasting in the less developed parts of the world are overcome—whether by aid from the industrially advanced countries or through self-development—the competition for radio frequencies will be intensified and concern over their use for propaganda purposes will be increased.

These international problems will grow and others will arise as a result of the development of the technique for space-satellite communications. Steps are already being taken to make use of this technique. In the United States an "active" relay system with world-wide coverage via three satellites orbiting near the equator so as to maintain fixed locations in relation to the earth's surface at an elevation of 22,300 miles (plus four satellites at somewhat lower altitudes to cover the polar regions) is under development. A system of more limited range is now being pushed up, consisting of a reflector and active satellites at an altitude of 1,000 miles. These systems are designed for military use, but similar systems could provide links between all continents for high-quality civilian radio and TV signals and for commercial point-to-point communications. The U.S.S.R. is proceeding with the development of its own space-satellite communications system.

The danger inherent in the development of space-satellite communications lies in the additional strain it will place upon international relations in the absence of international agree-

ments on policy and organization to control its use. As things now stand, the world faces the probable extension of cold war rivalry by this means. The first power to begin extensive use of this new means of communication will initiate the deadly cycle. The second power will then try to outdo the first with a rival space-satellite communications system, and so on until international agreement becomes almost impossible to achieve. The extension of radio and TV broadcasting range to the whole world will intensify the propaganda use of these media.

Inadequacy of Present Organization

Unfortunately, there exists today no international organization with stature adequate to cope with the urgent problems in the use of the radio spectrum for communications. The consequence is that these problems are dealt with unilaterally or bilaterally at the national level. There they are handled as political issues by foreign offices and heads of state, or—at the lower level—by specialized national administrative agencies or the private corporations which operate communications facilities. The further consequence is that these problems, as between the great powers, are pawns of cold-war pressures, while the needs of the underdeveloped countries in this area languish for want of proper international organization as a means to solution.

The International Telecommunications Union, some might think, should be able to provide the needed forum for policy-making and administration. The ITU for more than a century has been developing integration in technical standards, operating procedures, and rates of common carriers of communications by wire and radio. It also administers the policy on allocation of radio frequencies which is determined periodically by its more than 100 member nations. It is the United Nations' special agency for telecommunication affairs. It maintains close relation both with the UN and with other special agencies such as UNESCO, as well as with such regional organizations as the European Broadcasting Union and the International Radio Organization. It may well be that within the experience of the ITU and its associated organizations there may be

found the elements of organization and policy which might be extended to the world-wide arena as a means of solving the present international problems of broadcasting.

The ITU, however, does not have the jurisdiction to tackle these problems in the *use* of radio frequencies once allocated. The best evidence of its strength and weakness in this regard is supplied by its position on space communications. In its 1959 Plenipotentiary Conference, the ITU adopted a resolution on "Telecommunication and the Peaceful Uses of Outer Space Vehicles." Its concerns in this connection are stated to be the provision of international cooperation and agreements for (1) allocation of radio frequencies, (2) standards for telecommunication equipment, (3) codes for transmission of information from space vehicles, and (4) adaptation of the general telecommunication network to meet the data-processing requirements on the surface of the earth. It is significant that here the ITU was declaring its capacity to handle international problems in the stated respects for *all outer space vehicles*, not simply those concerned with satellite broadcasting. This technical competence marks the boundary of ITU's jurisdiction. For the same resolution concludes with a plain warning:

> It is important to note that . . . the part to be played by the I.T.U. in the use of outer space will be limited to technical and operational aspects of the new telecommunications means to be developed. As regards the possible purposes for which these means are used, the I.T.U. is not responsible for contemplating any regulation or control.

It would be quite wrong to assume that, having no jurisdiction to deal with the *use* problems of international broadcasting, the ITU ignores them. On the contrary, we find it warning us of the significance and gravity of the problems and of the fact that no adequate organization exists for their solution. Thus, in its 1959 report to the UN Economic and Social Council quoted above, the ITU says:

> Telecommunication already plays a very important part in the modern world with its influence on the political, economic and social levels. Moreover, scientific and technical progress in the next ten years will introduce un-

> precedented achievements in this field and it is no exaggeration to assert here and now that telecommunication will play a primary role both on the national and on the world levels and it could also be pointed out that the most difficult problems are not generally of a purely technical nature and that telecommunications questions should more and more command the attention of governmental authorities at the highest level. . . . Obstacles to freedom of information as far as transmission are concerned will hence soon be only of a political and economic nature and the I.T.U. can but express the hope that the appropriate international organizations will soon manage to overcome them.

If not the ITU, then why not look to UNESCO to solve the use problems confronting international broadcasting? UNESCO as presently constituted is not adequate to the task of accommodating the political, economic, and social pressures which comprise the obstacles to orderly international use of radio frequencies (be it space-vehicle broadcasting, high-frequency international broadcasting, or the development of large programs for the use of radio for underdeveloped countries). For this there are obvious reasons. UNESCO's jurisdiction is much broader than these crucial problems. Even its Division of Mass Communications has its efforts spread over cinema, print media, and visual aids as well as TV and aural broadcasting. UNESCO is thus organizationally too diffused over the whole cultural area to be appropriate as the means for solving the political and economic problems of international cooperation in telecommunications. Moreover, UNESCO is not invested by its member states with the staff, budget, or responsibility needed to cope with these problems. UNESCO has, within its limited resources, done good work with some aspects of radio and TV in relation to underdeveloped countries, and it has done excellent work in its efforts to improve the quality of TV and radio programming. But it involves no invidious reflections on the hard-working personnel of UNESCO to conclude that it was neither established to conduct, nor is now able to conduct, the essentially negotiatory and administrative functions required to solve the use problems of radio which concern us here.

New Basis for Negotiation

This analysis leads to a plea for the creation of a new specialized agency of the United Nations to fill the vacuum existing in the area of use problems of radio. It should be designed initially for international negotiations leading to agreements on such problems as space-satellite broadcasting, high-frequency propaganda broadcasting, and provision of radio aid to underdeveloped countries. In designing this new agency, provision should be made for it to take on whatever administrative duties are entailed by the agreements. As concerns staff, men of the stature appropriate to international negotiation on nuclear fission and disarmament should be named to conduct it.

It would be presumptuous to speculate further as to its program and organization. One suggestion, however, is in order. There is to be found in the experience of the European Broadcasting Union and the International Radio Organization much pertinent information bearing on the question of how international collaboration can be achieved for joint operation of an international network for broadcasting. In particular, the experience with "Eurovision" (the thirteen-member international TV network in Western Europe) and with "Intervision" (the Socialist Bloc counterpart) may provide a prototype for the international organization which some day may operate what might be called "The Space-Satellite Broadcasting Agency."

In this summary presentation, many pertinent problems have been slighted. For example, differences in language, national institutions, and mores will present severe problems in international programming for space-satellite broadcasting. They may force such broadcasting to begin on a lowest common denominator of programs of weather information, public events, and sports events. Problems of multiple engineering standards for TV and questions of available spectrum space for broadcast channels which existing broadcast receivers will accept have also been passed over. But these and other problems as yet unforseen exist in order to be solved. They will be solved by following the policy which former FCC Commis-

sioner E. M. Webster observed to be implicit in international frequency allocation: "Each user and group of users has been forced by circumstances to accept a policy of 'give and take,' realizing that he must give in some instances in order to receive in others." Our technology has offered us the means to use radio for world purposes of a constructive kind. The unacceptable alternative is to use it to promote destructive tendencies.

"Just as the United States has no clear policy for apportioning its own share of spectrum space, so it has lacked satisfactory means of determining policy as a basis for negotiations with other nations. The United States, in preparing positions for international negotiations, has in effect asked Federal and other claimants to state their needs, and then presented the total as the United States requirement. In those portions of the spectrum where the total of these requirements has been small enough to be accommodated along with the needs of the rest of the world, our delegations to conferences have had a negotiable position. In some cases, however, the total stated requirements have exceeded not merely those which could reasonably be put forward as the proper United States share, but have actually exceeded the total physical content of the bands. Furthermore, there is no permanent mechanism by which the stated requirements of United States users can be adjusted with equity and safety. The imperative need for means of making such adjustments hardly requires elaboration."

—*From "Telecommunications: a Program for Progress," the Report of the President's Communications Policy Board, March 1951.*

THE EVOLUTION OF TELEVISION: 1927-1943

As Reported in the Annual Reports of the Federal Radio Commission and the Federal Communications Commission

The history of television, the art-of-seeing-at-a-distance, goes back a long way. There is even one volume with the title, *4,000 Years of Television.* However, it should be noted that although the development of television *technology* has taken place over a long period of time, the development of television *broadcasting* has taken place within the past 40 years.

The path of television has been from the status of a scientific curiosity, through an era of tortuous technical, financial, regulatory and organizational development, to an omnipotent presence in ninety of one hundred American living rooms, and an unbelievably powerful industry.

During the greater portion of this period of evolution—since 1927—a governmental regulatory agency for broadcasting in the United States has been in existence. Both the Federal Radio Commission and the Federal Communications Commission have maintained a careful watch on the development of domestic television broadcasting. The outlines of this watchfulness have been reported each year in the FRC or FCC *Annual Report.*

As mentioned in this issue's Editorial, adequate historical works are few and often of doubtful accuracy. These *Annual Reports* may also be characterized as skimpy, and might, in some cases, bear factual revision or at least reinterpretation in the light of current knowledge. They are also unbalanced in part, as for example the inclusion of a lengthy biased discussion of RCA's role in television in 1928, while virtually ignoring such American pioneers as Jenkins and Farnsworth, among others. These documents do, however, have the overwhelming advantage of being *official.*

From them we may, with some confidence in factual accuracy, examine the fascinating panorama of the growth of a great American industry with a direct connection to virtually every aspect of our society.

Abstracts from these *Annual Reports* has been done in verbatim fashion as a service to the scholar, without detracting from potential interest to the layman. Many of these documents are virtually unobtainable, even in depository libraries. For example, during the middle years of World War II, *Annual Reports* of the FCC were only issued in a severely limited number of mimeographed copies that are now virtually all crumbling with age.

It is proposed to present, in future issues of the JOURNAL, further installments of the history of broadcasting as reflected in the eyes of the Federal agency with direct responsibility for its regulation. For example, a continuation of the history of television into the period of the "freeze," and an exploration of the development of frequency modulation and standard AM radio.

First Annual Report of the FRC—1927

Broadcasting Frequency Band, General Order No. 4, April 5, 1927 (p. 13)—In view of the manifest inconvenience to the listening public which would result from any immediate widening of the frequency band devoted to radio broadcasting, the Federal Radio Commission will not at this time allocate to broadcasting stations frequencies other than those between 550 and 1,500 kilocycles (545.1 to 199.9 meters), except on specific request of such stations. It believes, however, that the band between 1,500 and 2,000 kilocycles (199.9 to 149.9 meters) should, so far as may be practicable, be held open for experimental work in broadcasting and allied forms of radio service, to the end that, with the further development of the art, this band may be eventually made available for broadcasting, whether for the ear or the eye, if it shall prove particularly well adapted to such type of service to the public.

Second Annual Report of the FRC—1928

Television (pp. 21-22)—The recent advances in radio television threaten to create serious problems. The commission has allowed a few broadcasting stations to experiment with television in the broadcast band on their assigned channels on condition that this form of communication be limited to a small amount of time per day and be so conducted as not to cause interference on adjacent channels. There is also a distinct development of television in the high-frequency band. It has been urged upon the commission that it should permit regular television service in the broadcast band as well, because of the fact that a large potential audience is already at hand and in some cases the ordinary receiver can be adapted to receive television by the addition of certain apparatus. Television signals, however, will subject the broadcast listener to objectionable noises. The International Radio Convention limits the broadcasting band to telephonic signals. The commission has not yet determined its final policy with reference to this subject.

High-Frequency Broadcasting, Relay Broadcasting, and Radio Television in the Band 6,000 - 23,000 Kilocycles (p. 32)—In a brief filed with the commission on April 6, 1928, Dr. Alfred N. Goldsmith, chief broadcast engineer of the Radio Corporation of America, explained the purposes and the national and international significance of international relay broadcasting. In another brief filed by him on May 14, 1928, he set forth an outline of the work heretofore accomplished and in contemplation in the field of television. These two briefs are set forth in Appendixes M (1) and (2) as illustrations of the claims which are being made in behalf of those who are most optimistic with regard to the future of these forms of radio communication.

On June 22, 1928, the commission, through its high-frequency committee (Commissioners Sykes and Caldwell), sent a form letter and a questionnaire to each applicant for a license covering such a service in the band in question. (Appendix M (3).) The letter set forth the bands under consid-

eration and their approximate day and night distance ranges, suggestions as to the channels available and the separation necessary, the number of applications received, and a suggested order of priority. Policies in this field have not yet been determined.

Appendix M (2): Television, or Seeing At a Distance (pp. 252-253)—Dr. Alfred N. Goldsmith, chief broadcast engineer of the Radio Corporation of America, filed with the commission on May 14, 1928, a brief on television. The brief, in part, follows:

> Radio television is at a stage where it is prepared to leave the seclusion of the research laboratory and enter into the daily affairs and uses of man. Intensive development work of an experimental nature has already been carried on and transmission of television material is at hand through confidential experiments and transmissions carried on at Schenectady, Pittsburgh, and New York. In other words, television is not a vague and remote project, but, while still experimental, is an imminent and plausible probability. Indeed, a fair parallel is to compare television in its present state of development with ordinary broadcasting in its condition in 1921. The wise policy of the Government which encouraged the development of broadcasting at that time, is [sic] similarly applied to television at the present time, will lead to a tremendous and desirable growth of that art as a service to the public.
>
> The usefulness of television as a service is self-evident. At the risk of repeating the obvious, it should be pointed out that man gets his impressions of the outside world through two major channels, sight and sound. It is not clear which of these channels is the more effective, but assuredly each of them is of tremendous value to mankind, and, in consequence, their combination is more potent than either alone.
>
> In effect, the broadcasting stations of the United States send their messages to millions of blind listeners. In removing the darkness from the home of the listener-in, in a literal sense, and adding the television picture, a degree of closeness of contact between the artist, speaker, or minister hitherto unobtainable at once becomes possible.

When one considers the number of important forms of television programs which could be sent to the broadcast listeners-in and lookers-in, one is compelled to curb one's imagination. Everything that the drama can afford, that the musical comedy has to offer, that the debating stage can provide, that the concert stage can furnish, that the motion picture has given to humanity, can be brought into the home with synchronized sound as a complete source of thoroughly satisfying and highly interesting human entertainment, instruction, and edification.

In carrying forward so serious and important a program, it is desirable to consider the various types of television service which will be required, since these form three main divisions corresponding, approximately, to the existing or projected types of sound broadcasting:

1. *Urban service.*—The first type of service to be considered is service to persons residing in a typical city of considerable size, where the problem of distribution of radio waves through steel structures having marked absorption for such waves exist. A certain band of wave lengths or frequencies is believed to be suitable for television in such district, and will be first experimentally tested for the purpose and later utilized on a systematic service basis.

2. *Suburban and rural service*—Outside of the large towns reside great groups of prospective lookers-in who will find in television service a new means of contact with persons outside of their normal range of travel. These areas are much greater in dimensions than the city areas and, in addition, have a different type of terrain. As a result, a different band of wave lengths or frequencies is anticipated to be necessary for satisfactory television service to this group of lookers-in.

3. *International service.*—Just as in the case of broadcasting it becomes necessary for many personal, national, and international reasons to foster the development and growth of international broadcasting through the assignment of relay broadcasting channels, so it is necessary in the field of television to provide for international television through relay television broadcasting channels. These channels are intended to span oceans or continents and to carry the television image from one country or continent to one or more other countries or

continents. Since the distance to be covered and the nature of the intervening territory (generally an ocean) is entirely different in these cases from the two preceding, relay television broadcasting will require its own separate allocation of channels.

An explanation of the 100-kilocycle channel width requested for television broadcasting in these initial assignments is of interest.

The width of channel in television broadcasting (expressed in kilocycles) determine the field of view of the picture and also its clarity or fineness of detail. For example, a narrow band of frequencies assigned to television would permit the transmission only of unpleasantly crude images of restricted dimensions, and would therefore at once block the development and public appreciation of this new art. Even the 100-kilocycle bands which have been recommended are capable of giving only a picture of moderate dimensions and of fairly acceptable sharpness and clarity. To narrow the bands below the 100-kilocycle value would necessarily block effective progress in this new field.

The granting of experimental licenses on the various recommended television broadcasting channels will encourage a rapid development of this new art and its corresponding coordination with broadcasting, which will lead to the provision of a completely satisfactory, and hitherto unobtainable, radio sight-and-sound service to the people of the United States and even of the entire world.

To develop the three basic types of television broadcasting requires permission from the Federal Radio Commission to explore experimentally the television transmitting capabilities of a considerable number of 100-kilocycle bands between 1,500 and approximately 17,000 kilocycles. We know very little of the television transmission capability of these bands, and we shall never determine how to utilize them effectively for the entertainment and instruction of the public by television unless encouragement is given those planning to develop the art through authorization experimentally to transmit television material on such wave lengths and to determine conclusively the sort of service given in urban, suburban and rural, and international television services on each of these bands.

Specific Justification For Grant Of Experimental Licenses For Radio Television Broadcasting To The Radio Corporation Of America (pp. 253-255)—1. Television is a more difficult service even than telephone broadcasting and requires its own special assignments. If television is placed on ordinary broadcasting wave lengths the listeners will hear unpleasant sounds. Conversely, television receivers tuned to broadcasting wave lengths will receive a blur, but no picture, from an ordinary telephone broadcasting station. Permanent television broadcasting of high quality appears more likely upon the shorter wave lengths. The Radio Corporation of America has had wide experience in the handling of these short waves.

2. The establishment of a television service opens up an entirely new channel of mass communication—broadcasting for the sense of sight. In other words, optical and electrical experts are required for the development of television transmission and reception. Such men are available to the Radio Corporation in its own staff, and on the staffs of the General Electric Co., Westinghouse Electric & Manufacturing Co., and Radio Corporation of America Photophone (a recently formed organization for the production of sound-motion pictures).

3. All considerations justifying the grant of short waves to relay broadcasting which have been mentioned hold as well for television broadcasting. As has been pointed out previously, the Radio Corporation meets the necessary requirements very fully.

4. Television broadcasting also requires special wave bands suitable for urban, suburban and rural, and international transmission to television programs, respectively. These wave bands will not be interchangeable at any given time. Through extensive experience in the short-wave band, both in transmission and reception, the engineers of the Radio Corporation of America are able to select the most suitable wave bands and utilize them effectively.

5. The major television service over long distances will presumably be in Europe, with extensions of service as soon as possible to South America and to Hawaii, the Philippines,

and the Far East, respectively. The Radio Corporation has the necessary foreign contacts or stations at the points in question. An interesting example of this is broadcasting station KZRM, at Manila, the station of the Radio Corporation of the Philippines, which is a subsidiary of the Radio Corporation of America.

6. Many careless statements have been made as to the frequency band width required for television. Television pictures are made by rapidly drawing a series of lines of variable darkness below each other, the process being so rapid that the lines in question blend into a composite and apparently continuous image. The Radio Corporation can be depended upon, on the basis of its long experience in radio broadcast transmission and the furnishing to the American public of radio-receiving equipment on the largest scale, to develop television broadcasting along constructive and satisfactory lines, and in such fashion as to give a service of permanent value to the public.

7. The band widths required (for single side-band transmission) for various types of television are as follows:

For a 24-line picture, 5 kilocycles.

For a 48-line picture, 20 kilocycles.

For a 96-line picture, 80 kilocycles.

When it is considered that even fairly crude newspaper halftone illustrations have from 150 to 300 lines, it will be appreciated that pictures of continuing interest to moderately discriminating lookers-in will require at least 100 kilocycle bands. This will suffice merely for showing action of two or three figures clearly with a certain amount of background detail.

In other words, a 5-kilocycle band will permit the television broadcasting of a crude image of a head, with comparatively little detail. A 20-kilocycle band will permit the broadcasting of the head and shoulders of the actor or speaker with more detail. An 80-kilocycle band will permit the transmission of the picture of two or three actors with fairly acceptable detail.

The allocation of bands 100 kilocycles wide for television is strongly advocated, since this is clearly the minimum basis for a true television service of permanent interest to the public. It may be anticipated that uninformed or nonconservative television broadcasters would transmit an endless series of wabbly, blurred, fuzzy, or silhouette pictures, with bad flicker and of limited area. This would be called "television," but would truly be no more a useful example of television than a child's wavering drawing is a masterpiece of art by Rembrandt. "Television," so called, from irresponsible sources will benefit only the oculists of the United States in proportion as it ruins the eyesight of the public "lookers-in."

In the interest of saving both the vision and the television of the public, only an experienced and responsible organization, such as the Radio Corporation of America, should be granted licenses to broadcast television material, for only such organizations can be depended upon to uphold high ideals of service.

The Radio Corporation of America can be depended upon to broadcast television material with high technical and program quality, just as it has in the broadcasting field. It points to the consistently high standards of its broadcasting record in making its request for licenses permitting it to carry forward the equally successful development of television broadcasting and the consequent creation of a great new service to the public.

There seems to be much confusion in the public mind regarding terms used in television. Experts claim there is a vast difference between the transmission of an actual scene as it occurs and the transmission of a picture or document in facsimile.

R. H. Languey, an outstanding radio engineer, has cleared up some misconceptions regarding television. He said:

> Television means "seeing at a distance." On this basis any method of recreating on the screen a moving distant scene simultaneously with the action itself is television.

> The simultaneity is, however, absolutely essential. A motion picture is a record of a moving scene, and a motion picture itself constitutes television, except that it lacks the essential element of simultaneity. The transmission over wires and re-creation on the screen of a distant moving scene is television. The same transmission is also television and may be called radio television, but the contraction "radio vision" is likely to be decidedly misleading. There is already one corporation which uses this word in its corporate title and yet is not offering anything approaching television or radio television. The transmission and reproduction of a still scene or a still picture is not television and should be called picture transmission, whether by wire or by radio. Because there are to-day several reasonable successful methods of picture transmission, it can not be inferred that true television is near at hand. The problems of true television are entirely different and enormously more difficult than the problems of picture transmission.

Appendix M (3): Form letter and questionnaire sent by commission on June 22, 1928, to all applicants for high-frequency broadcasting on television licenses (pp. 255-257)— Commissioners Sykes and Caldwell, members of the short-wave committee, on June 22, 1928, sent the following letter to each applicant for a high-frequency broadcast license:

"The commission has completed the allocation of high frequencies in the mobile, mobile-fixed service, and fixed-service frequency bands 6,000 - 23,000 kilocycles, in accordance with the International Radio Convention, 1928. Study is now being made of the frequency bands designated by the convention as broadcast-service bands, together with the applications for high-frequency broadcasting, relay broadcasting; also television in so far as the latter may be considered in these particular bands....

The commission's technical adviser, Capt. S. C. Hooper, United States Navy, has made the following pertinent suggestions relative to the frequencies under consideration and concerning high-frequency broadcasting, relay broadcasting, and television:

Broadcasting bands	Width No.	Width of each broadcasting channel			Number of broadcasting channels			Number of bands 10 k.c.
		Present	Later	Possible ultimate	Present	Later	Possible ultimate	
6,000 to 6,150 kilocycles	150	40	20	10	3	6	15	15
9,500 to 9,600 kilocycles	100	40	20	10	2	4	10	10
11,700 to 11,900 kilocycles	200	40	20	10	4	10	20	20
15,100 to 15,350 kilocycles	250	40	20	10	6	12	25	25
17,750 to 17,800 kilocycles	50	40	20	10	1	2	5	5
21,450 to 21,550 kilocycles	100	40	20	10	2	4	10	10

For television it is suggested that experimental development stations be licensed between 4,500 and 5,000 kilocycles on five 100-kilocycle channels, one channel to be assigned to each zone for night use, and all five channels to be assigned to each zone for day use.

In addition, one 100-kilocycle channel in the 15,100 to 15,350 kilocycle band (or the 11,700 to 11,900 band) and two 100-kilocycle channels above 23,000 kilocycles are recommended for television experimental work.

If television experimental work is licensed in the band 4,500 to 5,000 kilocycles, this will reduce the number of 0.1 per cent channels for national and continental fixed service telegraph communication from approximately 275 to 200 in the bands having distance daylight range 50 to 700 miles, or from 150 to 110 [sic] in the bands having daylight-distance ranges 300 to 700 miles.

Forty applications for the 18 (or 36 depending on separation) channels available have been received. As there are a number of foreign stations already engaged in this type of service, it is obvious that only a portion of this total is available for use by the United States stations. These 40 applications include requests for from one to seven frequencies each. Therefore, on account of the shortage of available channels, it will be necessary to arrange the applications in priority of importance as regards 'interest, necessity, and convenience' to the public and to approve only the most important applications.

The following priority has been suggested:

1. Overseas and international relay broadcasting.

2. Long-distance broadcasting beyond reliable distance range of national broadcast network (550 to 1,500 kilocycles) transmissions.

3. Television experimental and development work.

4. National (within United States) relay broadcasting.

It must be borne in mind that high frequencies are primarily valuable due to their great carrying range, at low cost, and that they cause international interference. Therefore, they must be primarily assigned for long-distance uses when low frequencies are not practicable. . . "

Third Annual Report of the FRC—1929

Introduction (p. 2)—The commission, on May 20, 1929, decided that licenses for experimental stations, including relay broadcasting, visual broadcasting, and experimental aircraft, will be issued for periods of one year instead of three months as heretofore . . . Television, even in its present experimental stage, requires frequency bands at least 100 kilocycles in width. Some scientists estimate that a band in excess of 1,000 kilocycles in width may be necessary to give satisfactory detail in a moving picture transmitted by radio. Very serious problems will soon confront the commission if frequency bands are to be made available for regular television service.

The Radio Spectrum (p. 22)—Visual broadcasting is also conducted in this frequency range. This enterprise is still in an experimental stage and is governed by the following regulations adopted by the commission February 18, 1929:

Experimental Visual Broadcasting. That visual broadcasting be designated to include both television broadcasting and picture broadcasting, or moving-picture broadcasting and still-picture broadcasting, and that all licenses be of an experimental nature for a period of six months only, the licensees to report to the commission the results of their experiments; the transmitters to be located outside the city limits and sufficiently distant from important receiving centers to avoid interference.

For joint use to visual broadcasting licensees, the commission authorizes the following bands of frequencies for experimental use only: 2,000 to 2,200 and 2,750 to 2,950 kilocycles. In addition, the commission will authorize the operation of visual radio broadcasting transmitters in the band between 2,200 and 2,300 kilocycles, on the condition that they do not

interfere in any way whatever with the services of any other nation on the North American Continent and in the West Indies, and that licenses be subject to revocation in case there are any complaints from any other nation of any such interference. The commission may continue to issue experimental television or visual licenses in the broadcast band for operation between 1 and 6 a.m. only in accordance with General Order 50.

The commission adopted the following rules of priority in the granting of applications:

1. Those engaged in experimentation to improve the technique of visual broadcasting.

2. Those who employ methods which give the maximum definition with the minimum radio frequency band widths.

Special Services, Experimental (p. 28)--The commission, in its General Order No. 64, ordered all licensees of experimental stations to file with the commission, reports for each quarter of the year setting forth the nature of the experiments conducted and the results thereof. These reports contain the following statements:

(a) The specific hours of operation on each frequency during the period reported, together with a duly authenticated copy of the station log for that period.

(b) The general results accomplished in the period.

(c) The technical studies and progress at the time of filing.

Experimental Visual Broadcasting (p. 28)—Important preliminary information has been obtained on received field intensities necessary for adequate scanning of radio motion pictures in various types of apparatus; requisite receiver design and the necessary relation of selectivity and band admission for proper scanning; the relative definition of 24-48-, and 60-line scanning under various conditions; the improvement of light intensity and picture definition obtainable by the use of a special type of scanning now in experimental use, etc. By actual radio transmission and reception, the first

dependable information as to the effects of density, contrast, and image-form in special films has been developed.

Tests by radio have been made of a special system of scanner-synchronizing indication and satisfactory results obtained.

General Order No. 50, October 31, 1928 (pp. 55-56)—Picture and television transmission for general reception by the public will be referred to herein by the commission as picture broadcasting and television broadcasting.

Picture broadcasting and television broadcasting will be permitted (but only upon written application to and formal authority from the commission) on frequencies above 1,500 kilocycles, the exact frequencies or bands of frequencies to be determined by further order of the commission.

Between the date of this order and January 1, 1929, picture broadcasting and television broadcasting will be permitted to a limited extent (but only upon written application to and formal authority from the commission) in the broadcast band between 550 and 1,500 kilocycles, subject, however, to rigid conditions designed to prevent interference with reception from broadcasting stations. Among such conditions will be the following:

1. That the band of frequencies occupied by any such transmission shall be not wider than 10 kilocycles; and

2. That such picture broadcasting and television broadcasting be limited to periods of not more than one hour per day at a time of the day other than between 6 p.m. and 11 p.m.

The extent to which picture broadcasting and television broadcasting in the broadcast band of frequencies will be permitted to take place after January 1, 1929, if at all, will be determined by later orders of the commission, which will depend on investigation by the commission of the results of permitting such operation with respect to interference and the popularity of such transmission with the general public, and will further depend upon the interpretation which the commission shall be advised is proper of the obligations of the United States under the International Radio Telegraph Con-

vention of 1927, with respect to permitting anything other than telephonic transmission in the broadcast band.

General Order No. 55, December 22, 1928 (pp. 57-58)—The commission, in order to carry out the provisions of the radio act of 1927, having determined that public interest, convenience, or necessity requires the allocation of certain frequencies. . . . It is ordered . . . That of those frequencies between 1,500 and 6,000 kilocycles, the following are hereby allocated to those services and classes of stations enumerated herein, for assignment to individual stations in conformity with this order: . . . Experimental visual broadcasting: The frequencies 2,002 to 2,300, inclusive, and 2,750 to 2,950, inclusive.

General Order No. 56, January 14, 1929 (p. 58)—From and after the date hereof and until further order of the commission, neither picture broadcasting nor television broadcasting will be permitted in the broadcast band between 550 and 1,500 kilocycles, except upon written application to and formal authority from the commission, and then only between the hours of 1 a.m., and 6 a.m., local time at the location of the transmitter. The written applications shall be on forms provided for that purpose by the commission.

For the purpose of determining whether picture broadcasting and/or television broadcasting may be permitted in the broadcast band in the future either at all or to a greater extent than above authorized, the commission has determined to hold a hearing for the presentation of evidence as to whether such broadcasting can be accommodated on a 10-kilocycle band of frequencies; whether such transmission will result in undue interference with the broadcasting of other stations; whether there is any general public interest in having such transmission take place in the broadcast band rather than in the high-frequency band, and such other questions as will bear upon the issue of whether permission of such transmission in the broadcast band will serve public interest, convenience, or necessity. This hearing will be held at the

office of the commission at Washington, D. C., on February 14, 1929.

General Order No. 74, October 11, 1929 (p. 66)—Experimental visual broadcasting: The frequencies 2,000 to 2,200 kilocycles, inclusive, and 2,750 to 2,950 kilocycles, inclusive. The frequencies 2,200 to 2,299 kilocycles, inclusive, provided that such use will not interfere with radio services in other North American countries.

Fourth Annual Report of the FRC—1930

Experimental Services, Visual Broadcasting (p. 68)—"Visual broadcasting" includes the broadcasting of both television and pictures, which are intended to be received by the public. Point-to-point picture transmission, such as facsimile or telephotography, are not included with visual broadcasting.

Four frequency bands, each 100 kilocycles wide, were set aside for visual broadcasting by General Order No. 74, viz, 2,000-2,100, 2,100-2,200, 2,750-2,850, and 2,850-2,950 kilocycles. In addition, the channel 2,200-2,300 kilocycles is designated for experimental visual broadcasting on condition that no interference is caused to the radio services of any other nation on the North American Continent and in the West Indies.

The commission did not recognize visual broadcasting as having developed to the point where it has real entertainment value. Therefore, all licenses were issued on an experimental basis, and licensees are required to submit quarterly reports covering the experimental development of this service. Frequency assignments were made only as the result of hearing and based on the fact that the applicant was a qualified experimenter and could be expected to contribute to the advancement of the art.

Fifth Annual Report of the FRC—1931

Experimental Visual Broadcasting (pp. 53-54)—There has been a large amount of public interest shown in the development of visual broadcasting (television) and its possibilities

for public entertainment and use. The public interest has stimulated the laboratories working in this field to increase their efforts to improve the art.

There has been in the past year very material improvement in the quality of the transmissions of visual broadcast stations and the detail of the image which is received. Many of the experimental transmissions consist of motion-picture films which provide ample opportunity for observation. However, there has been much development in the production of studio programs of public interest. The development of pick-up devices to include a complete scene and the production of plays especially for visual broadcasting purposes have received special attention. Several stations have coordinated the visual broadcasting with regular sound broadcasting.

The amount of detail which can be transmitted and received in an image is a function of the number of picture elements which are transmitted. The majority of the stations now operating in the visual broadcast bands between 2,000 and 3,000 kilocycles have standardized their transmissions for the present, and their images are made up of 60 lines per frame and 20 frames per second; but this has not been universally adopted.

In order to obtain greater detail in transmitted images, there have been developed methods of scanning which differ materially from the method used in the majority of visual broadcast stations. There has been no effort on the part of the commission to require any standard method of scanning or a standardization of the number of lines per frame or frames per second which are transmitted. The experimental visual broadcast stations have been given complete freedom in developing the art.

In order to obtain an image of great detail it appears to be necessary, using the present methods of radio technique, to transmit higher modulation frequencies, which in turn require a wider frequency band to accommodate the transmissions of this type of station. The present band widths permitted for visual broadcasting on frequencies between

2,000 and 3,000 kilocycles are 100 kilocycles wide, or ten times the band width required for a sound-broadcast station. Consensus of engineering opinion indicates that in order to transmit a picture having satisfactory detail the band width required will be many times that now available in this frequency range. The needs of other essential services for frequencies in this band appear to make it impossible to provide frequencies in this frequency range other than those now used for visual broadcasting.

The commission has authorized a number of laboratories to investigate the possibilities of transmission of images in the following bands of frequencies:

43,000-46,000 kilocycles
48,500-50,300 kilocycles
60,000-80,000 kilocycles

Preliminary reports indicate that these very high frequencies show great possibilities, and many transmissions are now being observed. It is, however, too early to form an opinion as to the suitability of these bands. In view of the possibility of visual broadcast requiring very wide frequency bands, no limitation has been put on the band width to be used in the very high frequencies. Licensees in these bands are authorized for the present to use as great a portion of the band as is necessary in order to transmit the best picture possible.

Sixth Annual Report of the FRC—1932

Experimental Visual Broadcasting (pp. 42-43)—While no startling inventions have come to light in television during the past year, the progress that has been made has been marked by a steady improvement in the detail of pictures transmitted. This improvement has been made possible through increased attention to technical details in the optical pick-up system, in the photoelectric cell and amplifying systems, and in the actual modulation of the radio waves emitted. This development has in a general way paralleled the progress that was made in the early stages of sound broadcasting.

Much attention has been given to the part of the spectrum in which television emission will best fit. Although there are at the present time four 100-kilocycle bands between 2,000 and 3,000 kilocycles assigned to television, it has been evident for a considerable time that this space is not sufficient to meet the requirements of this new and growing art to furnish entertainment to the public. The experimenters have turned to the unexplored regions above 30,000 kilocycles. The work at these frequencies has shown signs of real promise as a future locus for this service, and the Federal Radio Commission has assigned wide frequency bands in this region for experimental work in television. Proposals have been received by the commission from the industry to increase the space in this band in order to protect the future of television.

Although considerable progress has been made in scanning methods, using both the mechanical type of scanning and the electrical or so-called cathode-ray type of scanning, it appears that many new developments must still be made before television can be accepted as a satisfactory entertainment service. While attempts have been made to broadcast scenes covering large areas, the majority of television stations have limited their transmissions to faces of one or two performers at most. This type of program, while of interest because of its novelty and usefulness for experimental work, has a very small amount of sustained "look-in" interest. Such programs fall far short of what the public has been led to expect in the way of entertainment, considering especially the fact that the technical improvements made during the last few years in sight-and-sound motion picture technique have created in the mind of the public a desire for very high technical standards of performance.

Seventh Annual Report of the FRC—1933

Experimental Visual Broadcasting (p. 31)—The prediction made in the Commission's last report that the very high frequencies would be the final locus for visual broadcasting appears to have been justified. A number of licensees have given up their licenses specifying the lower frequencies and

others have stated that they were satisfied that the lower frequencies were unsuitable, but desired to continue research in these bands for a short period to complete certain problems in progress.

The quality of pictures, which it has been demonstrated is possible to transmit on the very high frequencies, has steadily increased, and some laboratory productions are capable of holding sustained interest. Pictures need no longer be confined to "close ups," but larger scenes may be transmitted. The art, however, has not as yet progressed to a stage which would justify the adoption of standards by the visual broadcasting industry. Although much progress has been made in the laboratory, visual broadcasting is still in the experimental stage.

1934

Presumably due to the various changes attendant upon dissolution of the Federal Radio Commission and establishment of the Federal Communications Commission, apparently no Annual Report was issuel for the fiscal year 1934.

First Annual Report of the FCC—1935

Experimental Visual Broadcasting (p. 27)—Although the Commission licensed no new visual broadcast (facsimile or television) stations during the past year, the general interest of the public in television has increased substantially. Interest in television has been stimulated greatly by the activities in certain European countries. Great Britain and Germany have given considerable publicity to their activities in this field. Technically, television has been as highly developed in the laboratories of the private companies of the United States as has been accomplished in Europe.

The several companies carrying on television experiments in the United States have not standardized the several essential elements of transmission. Due to the wide band width necessary (approximately 3,000 to 4,000 kilocycles) and other requirements, frequencies above 40,000 kilocycles are the only ones available for high quality television transmission. In

order to transmit a picture of approximately 350 lines and 60 frames per second accompanied by voice, the wide band width is required. If this band is reduced, the detail or clearness of the picture is reduced accordingly. No commercial receivers are at present available to receive such programs. In order to give television service it is necessary for the different manufacturing companies to standardize their transmissions and produce receivers which can receive all programs transmitted. In short, from a laboratory standpoint television programs can be satisfactorily transmitted and received locally at the present development of the art but before it is finally useful to the public there are many commercial problems to be solved.

Second Annual Report of the FCC—1936

Visual Broadcast Service (Television Broadcast Stations and Facsimile Broadcast Stations) (p. 63)—In the new rules, visual broadcast service is defined as a service rendered by stations broadcasting images for general public reception. Under this heading is classified (a) television broadcast stations licensed for the transmission of transient visual images of moving or fixed objects for simultaneous reception and reproduction by the general public and (b) facsimile broadcast stations to transmit images of still objects for record reception by the general public. A single television broadcast station license authorizes the transmission of both the image and the associated synchronized sound (aural broadcast).

(a) *Television broadcast stations.* No new television broadcast stations were licensed during the fiscal year. Two applications were pending for new stations at the close of the year. The general public interest in television has increased substantially, due to extensive publicity by certain of the large manufacturers of radio equipment and the reports of development in television in European countries. On June 29 television broadcast station W2XF began operating in the Empire State Building, New York, on an experimental basis for public reception. A few receivers were distributed to selected observers. It was reported that the operation would continue as the experimental work permitted.

The new rules governing the television broadcast stations are very specific in prohibiting the sale of programs. The several licensees of television stations have recommended to the Commission certain standards of transmission. While these standards will not be approved by the Commission, the fact that several of the large manufacturers of radio equipment have virtually agreed upon certain standards indicates that this very difficult phase in television development as reported in the last annual report is progressing satisfactorily.

Report of the Engineering Department, General (p. 35)—However, the evidence showed the necessity for making tentative allocations in order to avoid the pitfalls of premature intrenchment resulting from huge expenditures for experimental apparatus, developing into future obstacles of a practical nature when the time becomes opportune for permanent allocation.

It was also indicated that even though the useful radio spectrum in the next few years will be seven times as extensive as that of today, there would not be made available such additional multiplication of channels, and that with the advent of new services such as television and other new uses for radio, the Commission would continue to be confronted with a dearth of radio facilities in the face of a large demand therefor.

While the technique of television has progressed during the past year, it seemed generally the consensus of opinion that television is not yet ready for public service on a national scale. It must still be considered as experimental. There are numerous obstacles to be overcome and much technical development is required before television can be established on a sound national scale. Nevertheless, the rate of progress is rapid and the energies of the laboratories of the country are being concentrated on the technical development of television.

Police Stations (p. 45)—The report of the Associated Police Communication Officers . . . with regard to the establishment of an intercity radiotelegraph network was received and given thorough study. As a result the Commission has

allocated frequencies, established rules and regulations, and provided an operating procedure for such a system. Due to some protests against the allocations which were filed by television experimenters, these rules are not yet effective. However, it is believed that a satisfactory solution will be reached and there will be no need to extend the effective date now set beyond September 15, 1936.

Third Annual Report of the FCC—1937

Visual Broadcast Service, Definition of service (p. 36)—The term "visual broadcast service" means a service rendered by stations broadcasting images for general public reception. There are two classes of stations recognized in the visual broadcast service: namely, television broadcast stations and facsimile broadcast stations.

The term "television broadcast station" means a station licensed for transmission of transient visual images of moving or fixed objects for simultaneous reception and reproduction by the general public. The transmission of the synchronized sound (aural broadcast) is considered an essential phase of television broadcasting, and one license will be issued for both visual and aural broadcast, as hereinafter set out.

The term "facsimile broadcast station" means a station licensed to transmit images of still objects for record reception by the general public.

Considerable development has taken place in both television and facsimile broadcasting during the fiscal year. Yet it is still generally conceded that neither has reached the stage of development that will permit standardization and commercialized operation. No applications were received during the fiscal year for commercial authorizations. However, all evidence indicates satisfactory technical progress.

Television frequencies. There is a great demand for frequencies for this service. Considerable information was presented at the informal engineering conference on June 8, 1936, indicating that, because of the progress in higher definition, television pictures of the detail now possible could not be suc-

cessfully transmitted within the limits of the two lower-frequency television bands of 2000-2100 kilocycles and 2750-2850 kilocycles, and that these frequency bands could be used to better advantage by other services. Accordingly, after considerable investigation, the higher band was deleted from television service and was made available for police assignments. However, the band of 2000-2100 kilocycles was retained for those desiring to carry on research work in the secondary or rural-service area. Three television stations were active on this band at the close of the fiscal year. These stations are investigating the possibilities that rural listeners can be supplied with television pictures of necessarily less detail. The only available space where there is room for high-definition television pictures is among the high frequencies (above 40000 kilocycles), which under the present state of development will not service much beyond the limits of the average metropolitan area and would not give satisfactory coverage for television service in large rural areas.

Improvements in television picture detail. One television station in New York City broadcast for public reception, using a high picture definition of 343 lines, until December 1936, when operations were discontinued in order to alter the equipment to transmit definition of 441 lines. Demonstrations of this definition in April 1937 were successful, and the improvement in the picture detail was very noticeable.

Television broadcast stations and applications. One construction permit was authorized for the erection of a new television broadcast station in Philadelphia, Pa. There were 17 licensed stations and 3 outstanding applications for construction permits for new television stations at the close of the fiscal year. Under the new regulations a single license authorizes both the aural and the visual transmitters.

The National Television Corporation application. Of especial interest is the application of the National Television Corporation, New York City, for a special temporary experimental authorization to operate a television broadcast station. During July 1935 this application was heard before an examiner, who

recommended that it be denied. Upon petition for reconsideration filed by the applicant, the Commission, sitting en banc, ordered that the application be reheard by the full Commission. Subsequent to this rehearing the Commission, on July 28, 1936, granted the requested experimental authorization for a period of 2 months ending September 15, 1936. By appropriate action this authorization was extended to December 15, 1936. Thereafter, the applicant filed with the Commission a petition for the issuance of a regular license to operate a television broadcast station. This petition was denied . . .

Fourth Annual Report of the FCC—1938

(a) *Television Stations (p. 65)*—Information available indicates that the technical phases of the television art are progressing in a satisfactory manner. However, it is generally agreed that television is not ready for standardization or commercial use by the general public. No applications for commercial authorizations were filed with the Commission during the fiscal year. Formal hearings were conducted on six applications for new experimental television stations.

Television has developed to the state where complete transmitting equipment is available on the market, but such equipment is costly and, because of the experimental status of the art, may become obsolete at any time due to new developments. A few of the existing licensees are attempting scheduled program transmissions as part of their research and development work.

Experimental Broadcast Service (p. 67)—Another program of experimentation authorized to be carried out and of unusual interest is the development of the so-called telemobile station, designed to televise programs originating in remote localities for relay to the main television station for broadcast to the general public. It consists of two large motor vans containing the television-control apparatus and the 400-watt visual and 100-watt aural transmitters. This represents the first complete development of this type licensed for experimental operation.

Fifth Annual Report of the FCC—1939

Television (pp. 45-46)—During the past year increased interest was shown in television development. A number of applications were received during the year requesting the use of television frequencies with experimentation directed toward the use of television as a public service which is in direct contrast to previous authorizations which were primarily directed toward the development of television equipment, standards, and systems of transmission. In view of this trend, the Commission designated a committee of three Commissioners comprising T. A. M. Craven, chairman; Norman S. Case; and Thad H. Brown to study the various aspects of television and to recommend to the entire Commission a policy which may serve as a guide to the industry. As a result of their study, there was issued the first television report which is briefly summarized as follows:

The first question studied by the Television Committee was necessitated by the request of the Radio Manufacturers' Association for approval of the technical standards for television, as proposed by that association. The second problem confronting the committee involves the disposition to be made of the various applications for construction permits to erect new television stations and, in particular, the applications requesting television facilities with the ultimate purpose of providing television to the public on a service basis.

The committee was of the opinion that any jurisdiction which the Commission may lawfully have in the matter of television standards is solely that arising from its specification of external-performance requirements for transmitting stations which the Commission may license in the future.

The committee was not unmindful, however, of the complex ramifications of the television problem, relative to the engineering, economic, and sociological expectations of this budding industry. With this point in mind, the committee and representatives of the staff make various trips into the field to secure a first-hand picture of the state of the art, as well

as to secure an index of possible future trends, as may be reflected in the thoughts of the present leaders of the industry.

Television appears to have thoroughly definite stages of development: First, a period of technical research, which includes fundamental research, initial development of manufacturing processes, designing of all equipment, and the adoption of a procedure for continuing improvements in accordance with the demands of the public; and, secondly, experimental operation, which includes the initial testing of television as a service to the public on a limited scale, and the ascertaining of the requirements of the public for types of programs and character of service, as well as securing experience in the production of such service. Along this line is also included the securing of information relative to propagation, characterizations, and allocation information from transmitters operating under service conditions. Included also in this phase of the development is the commencement of construction of facilities to insure an efficient distribution for a program service on a regional scale. The third stage of television development will be marked by the construction of transmitting stations throughout the Nation and the operation of television as a service to the public on a sound, economic basis. In this stage the public will be expected to purchase receivers with the expectancy of a stable television service of good technical quality, without too rapid an obsolescence of the instruments it has purchased.

Considerable credit should be given to the engineers in the industry for the present high state of technical development, and it is entirely possible that the technical quality of television produced in accordance with the proposed R.M.A. standards may be accepted by the public as a practical beginning, provided the public is also informed that improvements in quality and reduction in cost of equipment are possible as a result of future progress in scientific and engineering research. In view of this fact, it appears that rigid adoption of standards at this state of the art may either "freeze" the television industry, and thus retard future development, or may result in a high rate of obsolescence of equipment pur-

chased by the public, which may not be able to receive signals from a station that may have different standards from those now in use, or from stations employing standards which may be considered better than those now in use or proposed to be used, and at the present state of the art not now generally recognized or known. As a result of these two factors, considerable patience, caution, and understanding must be used at this time. Careful, coordinated planning is essential, not only by the various elements of the industry but also between the industry as a whole and the Federal Communications Commission.

The extreme limitation of a number of available television channels presents a serious problem, particularly in the early stages of television service, inasmuch as there are by now only seven channels developed from a technical standpoint. This scarcity of channels is a result of the fact that one television station requires a 6000-kilocycle band, and in order to proportionately conserve the available radio spectrum, it is, of course, necessary to restrict the number of these channels.

In addition to the scarcity of channels, the operation of a television station is a costly project, and at the present time without return from the sale of advertising or from sponsorship, due, first, to the fact that these stations are licensed only on an experimental basis, and, secondly, because the technical development has not reached the stage where it can be standardized in essential details for uniformity. From these points it appears highly essential that the industry be encouraged to undertake further practical research leading toward the development of methods which will permit more stations to be accommodated in the limited space in the radio frequency spectrum, as well as facilitating lower costs in the production of good quality program service to the public.

The Television Committee is preparing a second television report which will serve to determine policies relative to existing stations and action on the pending applications requesting television authorizations to operate stations as a service to the public.

Sixth Annual Report of the FCC—1940

Television Systems Study (p. 16)—Reports for the use of the Commission in connection with the television hearing were prepared on the practicability of various proposed systems of television. A joint report with the law department was also made on the patent situation in the television field, covering the ownership of important patents and patent licensing agreements. The department also participated in the formulation of rules and regulations governing the operation of television stations.

Reallocation of High-Frequency Bands (p. 65)—In consideration of the needs of high-frequency broadcasting and also the needs of television, the Commission found that 40 channels should be allocated to the broadcasting service between 40000 and 50000 kilocycles while continuing 7 television channels 6000 kilocycles wide below 108000 kilocycles, the present practical limit for television broadcasting.

This was accomplished by reallocating the band 44000 to 50000 kilocycles previously allotted to television to the high frequency broadcast service. The band of frequencies from 42000 to 50000 kilocycles was made available for aural broadcasting. The same number of television channels below 108000 kilocycles was maintained by assigning the band 60000 to 66000 kilocycles to television in place of 44000 to 50000 kilocycles.

Television Broadcast Service (pp. 70-73)—At the beginning of the fiscal year, the Television Committee of the Commission, composed of Commissioners T. A. M. Craven, Norman S. Case, and Thad H. Brown, was charged with the duty of investigating and submitting findings with regard to the fixing of television transmission standards by the Commission and the disposition of a number of applications pending before the Commission for new television stations. The results of its studies were published in the committee's second report on November 15, 1939. The committee noted that certain progress had been achieved in television broadcasting since its first report of May 22, 1939. It was felt by the committee

that although the television industry had not advanced beyond the experimental stage, it had arrived at the point where more rapid progress could be expected by the licensing of a class of station to render sponsored programs to the public on a limited basis. A revision of the Commission's rules to make this proposal effective was recommended although the committee recognized that the development of television was still in a state of flux and asserted that—

> No interests should be permitted to raise public hopes falsely, nor to encourage public investments where the state of scientific or economic development leaves any doubt that such hopes and expenditures are justified for the use of the public property in the radio spectrum.

On December 22, 1939, the entire Commission tentatively adopted the rules recommended in this second report of the Television Committee, with minor modifications, and on the same date all parties interested in these proposed rules were invited to participate in a public hearing on January 15, 1940, before the Commission.

January Hearing. Leading concerns engaged in experimentation and research in the television field appeared and gave evidence upon the matters under investigation. This hearing extended over a period of 8 days, voluminous evidence was presented by the parties, and expression of opinion of different members of the industry with respect to the proposed rules was offered. The witnesses differed considerably in their views regarding the Commission recognizing or adopting the transmission standards which had been previously submitted to the Commission by the Radio Manufacturers Association.

Upon consideration of the record of the January hearing, the Commission adopted rules governing television broadcast stations which provided for two classes of television stations —class I and class II stations—indicating experimental research stations and experimental program stations, respectively. The rules provided that beginning September 1, experimental-program stations could defray the cost of produc-

ing programs by limited sponsorship. However, the Commission, in its report on said hearing, found:

> Actual demonstrations to members of the Commission indicate the need for further improvement in the technical quality of television. The evidence before the Commission reveals a substantial possibility that the art may be on the threshold of significant advances. Research in fact does and should continue in significant phases of the field. * * * The issuance or acceptance of transmission standards by the Commission, especially in combination with the more extensive experimental program service which will in all probability develop under these rules, would have a tendency to stimulate activity on the part both of manufacturers and the public in the sale and purchase of receivers for home use. It is inescapable that this commercial activity inspired and then reinforced by the existence of Commission standards would cause an abatement of research. To a greater or less extent the art would tend to be frozen at that point. Even more important, nothing should be done which will encourage a large public investment "in receivers which, by reason of technical advances when ultimately introduced, may become obsolete in a relatively short time. * * * It will be realized, * * * that the loss to the public by premature purchase in a rapidly advancing field might in a relatively short period exceed many times the present total cost of research."

April Hearing. On March 22, the Commission took cognizance of promotional activities in connection with the sale of television transmission and receiving equipment by a certain firm. Appreciating that such activities were contrary to the public interest by unduly retarding further research and development in the achievement of higher standards for television, the Commission suspended the effective date of the beginning of limited commercial operation of television stations and a further hearing was held on April 8. The parties who appeared and submitted evidence at this hearing were, with the few exceptions, the same as those who participated in the Commission's January hearing.

Upon the evidence given at the April 8 hearing, the Commission decided that in order to insure to the public a tele-

vision system which is the product of comprehensive research, the standards of transmission should not be determined at that time. It was further decided that no commercial broadcasting with its possible adverse effects on technical experimentation would be permitted until such time as the problem of transmission standards was fully explored. It was stated that a single uniform system of television broadcasting was essential and that the Commission would authorize full commercialization whenever the industry agreed upon standards insuring a satisfactory level of performance.

Present Promotional Rules. The Commission adopted rules embodying the principles arrived at pursuant to the April hearing and announced the conditional granting of 23 pending applications for new stations, provided that the applicants for these facilities submit experimental proposals for the development of a uniform system of transmission standards of acceptable technical quality. Subsequent grants gave assurance that television research would be undertaken throughout the Nation. Various licensees reported that an aggregate of $8,000,000 was available for this developmental work.

As previously noted, the advent of frequency modulation made it necessary to remove from the television service the band 44000 to 50000 kilocycles, substituting therefor 60000 to 66000 kilocycles, and allocating 156000 to 162000 kilocycles to other services licensed by the Commission, although the total facilities available for future use of television below 108000 kilocycles remained the same.

By the close of the fiscal year a National Television Systems Committee had been organized under the auspices of the Radio Manufacturers Association to explore existing television systems with a view to developing and formulating standards which would be acceptable to the industry as a whole and expedite the inauguration of a basically sound national system of television. With the Commission licensing a widespread number of stations for the purpose of developing standards and the coordinated work of this committee it is hoped that sufficiently efficient transmission standards may be evolved

which will enable the Commission to establish a commercial television broadcast service.

Other Development. Meanwhile, promising experiments with color television are under way, licensees are developing a special studicraft for television production, and there is increased use of larger screens for projection purposes.

Portable television equipment has been developed whereby programs may be originated outside of main television studios. This equipment is light weight and readily transportable and operates on frequencies above 300000 kilocycles. On many occasions outdoor events have been successfully broadcast by television stations. In some cases television programs have been originated in aircraft. As stated in another section of this report the proceedings of a recent political convention in Philadelphia were transmitted to New York by coaxial cable and there broadcast to a number of home television receivers.

There is under development a system of television relay stations for the distribution of television programs between cities similar to the national standard broadcast networks.

Seventh Annual Report of the FCC—1941

Television Broadcast Service (pp. 32-39)—Television transmission is accomplished by systematically breaking down the image of the scene to be transmitted into very small picture elements and transmitting signals proportional to the light and shade in rapid succession. The converse process takes place at the receiver where the image is reconstructed. This is done so rapidly that the eye perceives the result as a complete picture. It is fundamental that the receiver follow the breaking down or "scanning" process. To accomplish this it is necessary for the transmitter to send keying or "synchronizing" signals to maintain the original relationship of the transmitted picture units. The receiver is more intimately related to the transmitter than in any other kind of broadcasting.

There are a number of ways in which the picture can be broken down for transmission. Likewise, there a number of

ways in which synchronization is attained. All of these factors go to what is generally called "transmission standards."

Obviously, it is essential that all receivers be capable of receiving all transmissions, and that the best possible uniform system of standards be agreed upon. It is also important that these standards incorporate sufficient flexibility to accommodate future technical developments.

1940 Situation. At the hearings held in January and in April of 1940, the Commission found the industry divided upon the basic question whether television was ready for commercial broadcasting, and also found the industry at odds as to transmission standards. Some believed that television had not reached the point where it could offer sufficient entertainment value to justify commercial operation and that standardization would result in the freezing of the science at the then level of efficiency. Others were determined to proceed at all costs with the launching of television on a large scale.

In its report of May 28, 1940, on the April hearing, the Commission declared:

> As soon as the engineering opinion of the industry is prepared to approve any one of the competing systems of (television) broadcasting as the standard system the Commission will consider the authorization of full commercialization. That a single uniform system of television broadcasting is essential—so far as the basic standards are concerned—must also be amply clear. The public should not be inflicted with a hodgepodge of different television broadcasting and receiving sets.

Television entered the past fiscal year with a wide divergence in the industry on the matter of adopting standards. Because the situation was one which threatened to hold up coordinated television development indefinitely and to delay public service on a widespread basis, the Commission offered its cooperation to the industry along lines in furtherance of the achievement of higher standards by research and development.

National Television System Committee. First, it provided for new experimental television stations in various sections

of the country to engage in practical demonstration of competing systems. Later it cooperated with the Radio Manufacturers Association (RMA) in creating the National Television System Committee (NTSC). The RMA felt that "because of the inadequacy of the various suggested standards for television" all existing systems should be explored and developed, and new standards formulated. The NTSC was given this task for which it was well adapted, being organized from representatives of national technical organizations and companies broadly interested and experienced in the television field. The NTSC reconsidered all questions relating to television standardization and made report to the Commission on January 27, 1941. This report was the result of 5,000 man-hours of work and represented 60 meetings of the NTSC and its committees. Distribution of the proceedings of the committee involved 500,000 sheets of material.

1941 Hearing. The following day the Commission announced that a public hearing would be held beginning March 20, 1941, to consider the various engineering standards suggested, and also to determine when television broadcast stations should be permitted to broadcast commercial programs as a public service.

At this hearing the Commission found the industry had reached agreement that television broadcasting was ready for standardization. The standards as finally proposed by the NTSC at the hearing represent, with but few exceptions, the undivided engineering opinion of the industry. Some difference of opinion existed among broadcasters as to the date when commercial operation should begin. However, the Commission was of the opinion that the reasons advanced by some for the delay were not controlling. Other leading figures in the industry expressed the view that developments warranted prompt standardization and commercialization.

The standards proposed by the NTSC provided for most of the improvements held out as readily possible a year ago for monochrome transmissions (black and white pictures). These standards fix the line and frame frequencies at 525 and

30, respectively. The 525 lines provide for greater detail in the pictures transmitted than the 441 lines advocated a year ago. They give substantially equal resolution and more fully exploit the possibilities of the frequency bands allocated for television. Different line and frame frequencies will probably be required for color transmissions. This, however, is a matter for future consideration after color transmissions have had adequate field tests.

Previously one of the weakest phases of the proposed television standards was the synchronizing pulse which frequently caused the loss of the picture under interference conditions. A few weeks before the March hearing, developments were brought forth for greatly intensifying the synchronizing signals transmitted.

Rules and Standards. On April 30, 1941, the Commission promulgated rules incorporating television transmission standards recommended by the National Television System Committee. Provision was made for the use of frequency modulation on the sound carrier; previously amplitude modulation had been considered. Incorporated were alternative standards for the synchronizing waveform and the manner of transmission—namely, by amplitude modulation or frequency modulation. These alternatives permit universal reception by present receivers. Rules were adopted for commercial operation effective July 1, 1941.

Stations licensed for commercial operation are required to operate a minimum of 15 hours per week. Provision has also been retained for licensing television stations on an experimental basis, as well as experimental color transmissions.

As in the case of FM broadcast stations, no person or group may operate more than one television station in a given area. However, whereas a maximum of six scattered FM stations may be under the same control, the more limited television channels make three such stations the limit for the main television band.

The Commission's order accompanying the rules and standards provided that experimental television stations previously authorized would be issued construction permits for commercial operation upon a showing that the station construction would meet the new requirements. At the close of the fiscal year, two such stations received authorizations to begin 15 hours per week commercial operation. Five other stations, located in Los Angeles, Chicago, Philadelphia, New York City, and Schenectady, were converting their experimental stations into commercial stations. Seventeen others holding contruction permits for experimental stations in various parts of the country indicated their intention to start commercial service as soon as possible. By November 1 there were 8 commercial authorizations.

The Commission also announced that on or before January 1, 1942, the Commission would consider further restricting the standards with respect to the alternatives in regard to synchronizing signals. Consideration will also be given at this time to test data with respect to color transmissions and to recommendations as to standards which may be adopted for color television.

Developments. On January 6 and 7, 1941, the Commission witnessed television demonstrations in Philadelphia and New York City. In Philadelphia there was demonstrated a new method of transmitting synchronizing signals. It indicated a considerable advance in holding received pictures in place under adverse interference conditions. In New York City the Commission witnessed a home television receiver employing a projection cathode ray tube giving pictures 13½ by 18 inches and also viewed large-screen telepictures 15 by 20 feet for theatres and other public places. Demonstration of three-color television was also witnessed.

Eighth Annual Report of the FCC—1942

Television Broadcast Service (pp. 34-36)—July 1, 1941, marked the beginning of television broadcast service to the public on a commercial basis. Under the rules and regulations

adopted by the Commission in April of the same year for this type of service, each broadcast station was required to render a minimum of 15 hours program service per week.

Two television broadcast stations, both located in New York City, initiated program service to the public on a 15 hour-a-week basis, beginning July 1, 1941. In September, 1941, a station in Philadelphia was authorized to operate on a commercial basis, and in February, 1942, a station in Schenectady, New York, was likewise authorized. Thus, over the present fiscal year, four television broadcast stations have commenced and are continuing with program service to the public.

During June, 1942, the Commission authorized the completion with materials on hand of a fifth commercial station, located in Chicago, Illinois. The broadcast service that will be rendered by these five stations in various locations of the United States, augmented by the several experimental stations that continue to make limited broadcasts, should keep alive this new art during the war.

Station Construction. In addition to the five commercial stations authorized, as of July 1, 1941, 16 other permittees had authorizations for experimental television stations. Each permittee had indicated his intention to proceed promptly with the construction of the proposed station and to seek authorization for commercial operation at an early date. As of January 1, 1942, five of these permittees had obtained commercial authorization, with completion dates for station construction varying from one to six months. The eleven remaining permittees were unable to proceed with construction because of lack of equipment and each had obtained an extension for completing its proposed stations.

During the first months of 1942, it became evident that because of the war emergency equipment would not be available for constructing the unfinished stations authorized. On April 9, 1942, the Commission held an informal conference with television station permittees and licensees for the purpose of determining upon policies that might be followed during the war emergency. Representatives of the National

Television System Committee also attended this conference. Following the conference the Commission called upon the permittees of television broadcast stations to submit progress reports on station construction and equipment on hand or needed for completion of the stations authorized.

As previously indicated, the Commission on April 27, 1942, adopted the policy that no further authorizations involving the use of any materials would be issued by the Commission to construct or to change the transmitting facilities of any commercial television broadcast station. This action of the Commission did not, however, prevent further authorizations for experimental television station construction, and the Commission has since April 27, 1942, continued to issue authorizations for such stations upon a showing that the construction was necessary to carry forward worthwhile television research work.

Regulations. The operating rules and regulations for television broadcast stations adopted by the Commission in April, 1941, have not been changed except as to the minimum program service required of commercial stations. As a result of the Commission's conference with the television industry on April 9, 1942, the rule (Section 4.261 (a)) governing the minimum program service required was changed to require but four hours per week instead of 15 hours per week.

Standards. At the time the Commission adopted regulations and standards for commercial television broadcast stations, it also announced that on or before January 1, 1942, it would consider further restrictions in standards with regard to the alternatives permitted in synchronizing wave forms. The same announcement further stated that test data with respect to color transmissions and recommendations as to standards therefor would also be considered.

At the April 9, 1942, conference the National Television System Committee submitted a report recommending that the Commission's present standards be continued in effect for the duration of the war. This committee also stated that the

present knowledge of the art does not justify the setting of standards for color transmissions. Its recommendations were adopted by the Commission.

Ninth Annual Report of the FCC—1943

Television Broadcast Service (pp. 56-57)—Throughout the fiscal year commercial television has been subject to the Commission's policy adopted April 27, 1942, namely, that no authorizations would be issued which involved the use of any materials to construct or change the transmitting facilities of a television broadcast station. Although this policy did not preclude authorization of experimental television station construction, no applications concerning new experimental stations were received.

As of June 30, 1943, four television broadcast stations were licensed for commercial operation. Three of these stations have maintained a minimum program schedule of four hours per week, presently required of such stations by the Commission's rules and regulations, during the entire fiscal year. Two of these stations are located in New York City and have arranged their broadcasts so that only one station is on the air at a time, providing at least eight hours program service per week to the area. The other two commercial stations are located in Schenectady and Philadelphia, the latter station having been licensed to begin commercial operation on April 20, 1943. This station had previously rendered experimental program service. Each of the licensed commercial stations has devoted a part of its program service to civilian defense subjects.

Five experimental television stations have also provided scheduled program service of two or three hours per week throughout the greater part of the year. One of these stations is located in New York City, two are in Chicago, and two in Los Angeles. These experimental stations likewise included civilian defense subjects in their program service. Of the total of 28 experimental television stations authorized, about one-half are television relay broadcast stations used for transmit-

ting from places where suitable wire facilities are not available or for relaying programs from one television station to another for rebroadcast purposes. Both the Schenectady and Philadelphia stations rebroadcast television material being broadcast in New York City. The use of similar relay stations in connection with possible future network television broadcasting has been proposed, and present operation should furnish substantive data regarding the feasibility of such a project.

On October 27, 1942, the Commission deferred action on pending applications pertaining to commercial television broadcast stations which must be denied under its wartime policies regarding station construction. Thereafter, on February 23, 1943, the Commission announced that it would not dismiss television applications that may not be granted under the Memorandum Opinion of April 27, 1942, but would retain these applications in the pending files without present action. It was further provided that television application which had been dismissed under the "freeze order" could be reinstated.

It was also announced on February 23, 1943, that holders of construction permits for television stations might obtain licenses to operate existing facilities during the war on either an experimental or commercial basis, provided construction had reached a point where the station was capable of rendering a substantial service. Two television stations have such wartime licenses and another application is pending.

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LEGAL RESTRICTIONS ON USE OF PROGRAM MATERIALS

By Walter B. Emery

The important questions of copyright and other legal limitations on the use of broadcast program materials are usually considered "too complex" for the broadcaster without legal training. Although no substitute for specific professional advice, Professor Emery's article is designed to assist the lay broadcaster in preventing legal difficulties and in understanding some of the complexities of this field.

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THE creative works of others may not be used by radio and television stations except with the permission of the owners and under the conditions which they prescribe. Even though these works have not been copyrighted, they are protected, prior to duplication for sale, by common law as interpreted and applied in the several states.

Once these original materials are placed on the market for general sale, statutory copyright must be relied on for protection against their unauthorized use.

Dramatic and Dramatico-Musical Materials

Section 1(d) of the U.S. Copyright Code confers the following exclusive rights regarding the performance of dramatic works:

> To perform or represent the copyrighted work publicly if it be a drama or, if it be a dramatic work and not reproduced in copies for sale, to vend any manuscript or any record whatsoever thereof; to make or to procure the making of any transcription or record thereof by or from which, in whole or in part, it may in any manner or by any method be exhibited, performed, represented, produced, or reproduced; and to exhibit, perform, represent,

> produce, or reproduce it in any manner or by any method whatsoever . . .[1]

The courts have definitely established that these performance rights apply to operas, operettas, musical comedies, or other dramatico-musical works as well as ordinary dramas and stage plays. Any radio or television adaptations of these various dramatic forms are subject to the same exclusive rights.

It has also been clearly established that motion picture and kinescopic photoplays fall within this category and the exhibition of them on television without license would infringe Section 1(d) quoted above. There is some question as to whether the provisions of this section are applicable to the exhibition of what may be termed non-dramatic motion pictures and kinescopes. However, some authorities believe that the courts will lean in that direction and hold the unauthorized exhibition of such materials as illegal.[2]

It is the "public performance" of the above types of material without the permission of the owners that is prohibited. The courts have held that radio and television broadcasts are "public performances" within the meaning of the statute.[3] All broadcast stations, therefore, whether they be commercial or noncommercial, must secure clearances from the copyright owners before putting such materials on the air.

Music Materials

In the case of dramatic works as described above, unauthorized "public performance" is enough to infringe the Copyright Code. In the case of musical compositions and mechanical recordings thereof there is the added requirement that they be publicly performed "for profit." All commercial stations operating for profit must secure clearances for such musical compositions and recordings. It has been held that the unlicensed broadcast of a copyrighted musical composition by means of a phonograph recording on a sustaining program of a nonprofit radio station, which devoted a third of its time to advertising programs and used the revenue to defray operating costs, was a "performance for profit" within the meaning of

the Copyright Act, entitling the copyright owner to an injunction and damages.

The facts of this case were that Debs Memorial Fund, Inc. owned and operated Station WEVD in Brooklyn, New York, and was organized as a business corporation under Acticle 2 of the Stock Corporation Law of New York. The Fund had by-laws providing for non-profit sharing operation with all profits and surplus being used for the enlargement of the station's facilities and for improving the educational and cultural activities thereof. The Court stated that the basic purpose of the Fund was philanthropic and educational.

The Court held that "it can make no difference that the ultimate purposes of the corporate defendant were charitable or educational. Both in the advertising and sustaining programs, Debs was engaged in an enterprise which resulted in profit to the advertisers and to an increment to its own treasury whereby it might repay its indebtedness and avoid an annual deficit." The reasoning of the Court seemed to be that by providing a musical program such as the one in question, the station increased its number of listeners and made it more desirable as a station for paid advertising.[4]

The question arises whether the same rule applies to educational radio and television stations which operate on a strictly non-profit and non-commercial basis. There is an important difference between these stations and the Debs one in that they are prohibited from carrying any advertising at all. Also, the FCC rules definitely preclude any type of commercial or profit-making operation on the part of educational stations using reserved channels. Therefore, it appears that they are not required to get permission to use copyrighted music or recordings thereof from the owners.

Conceivably some question might be raised with respect to educational stations which carry programs produced by commercial concerns. For example, if an insurance company should provide the station without cost a series of educational programs on the subject of health with copyrighted musical selections being used as an important part of the

series, it might be argued that reference to the name of the company on the programs would be a means of building good will for the company which could have commercial value. Accordingly, in terms of the Debs case, it might be reasoned that clearances are required.

Another type of programming about which there might be some question would be the telecourse using copyrighted musical materials and involving the payment of registration fees from which the station and/or the school would receive substantial income. If the station and the sponsoring institution are both strictly non-commercial, it is not likely that any problem will arise.

Since the above-mentioned situations have not been presented to the courts for adjudication, it is believed that educational stations may assume that such practice, under the circumstances described, is permissable and does not violate the Code.

The American Society of Composers, Authors, and Publishers

Radio and television stations generally draw upon the resources of the American Society of Composers, Authors, and Publishers for recorded music. This society has a large repertoire of copyrighted music which is available for use by stations under contractual arrangements and on payment of an annual license fee.

The following definition of "users of music" appears in the current Articles of Association of the Society:

> "User" means any person, firm or corporation who or which
>
> 1. owns or operates an establishment or enterprise where copyrighted musical compositions are performed publicly for profit, or
>
> 2. is otherwise directly engaged in giving public performance of copyrighted musical compositions for profit . . .

In 1946, ASCAP attempted to enlarge its licensing activities to include educational institutions. Several institutions in

the East reluctantly entered into contracts with the Society paying annual fees for the use of music in the Society's repertoire. But numerous institutions strenuously objected and refused to accede to a demand for a license from this organization.[5]

The term "user" as presently defined by the society includes all commercial broadcast stations, but would not appear to include non-commercial stations operated by non-profit institutions. The standard practice for educational stations is to secure ASCAP licenses for nominal fees with freedom to use all the music in the ASCAP repertoire so long as no public performance for profit is involved.

What has just been said must be qualified. The ASCAP contracts with its members state that it has been assigned the public performance rights "of the separate numbers, songs, fragments or arrangements, melodies or selections forming part or parts of musical plays and dramatico-musical compositions, the owner reserving and excepting from this assignment the right of performance of musical plays and dramatico-musical compositions in their entirety, or any part of such plays or dramatico-musical compositions on the legitimate stage."[6] What this means is that the ASCAP license gives the broadcast station the right to use the separate songs and parts of musical plays, operas, operettas, oratorios, and the like, but not the right to use these dramatico-musical compositions in their entirety or any parts of them if they are picked up and transmitted from the "legitimate stage."

The rights for the performance of these dramatico-musical works in their entirety or parts thereof on the legitimate stage are spoken of as "grand rights." They are not assigned to ASCAP but are retained by the copyright proprietor, and no public presentation of the works in their totality or parts on the legitimate stage, either on a profit or non-profit basis, can be made without his consent. Securing such consent in each individual case it a matter of negotiation between station management and the copyright owner.

It should be mentioned that music may not be integrated on the sound track of motion picture film or kinescope and used by broadcast stations without the consent of the copyright holder.

Broadcast Music, Inc.

BMI, the competitor of ASCAP, charges license fees in terms of station rate cards. An important difference between the BMI and ASCAP contracts is that with the former the broadcaster obtains both "grand" and "small" rights in all musical compositions in the BMI repertoire for both radio and television. Since educational broadcast stations do not sell time and have no rate cards, they are able to negotiate contracts with BMI for performance rights at nominal costs the same as they do with ASCAP.

Performing and Recording Rights to Literary Works

On July 17, 1952, Congress amended Title 17 of the U.S. Code to extend to authors performing and recording rights in non-dramatic literary works, the law becoming effective January 1, 1953. The amendment gives to such authors exclusive rights as follows:

> (c) To deliver, authorize the delivery of, read, or present the copyrighted work in public for profit if it be a lecture, sermon, address or similar production, or other nondramatic literary work; to make, procure the making of any transcription or record thereof by or from which, in whole or in part, it may in any manner or by any method be exhibited, delivered, presented, produced, or reproduced; and to play or perform it in public for profit, and to exhibit, represent, produce, or reproduce it in any manner or by any method whatsoever. The damages for the infringement by broadcast of any work referred to in this subsection shall not exceed the sum of $100 where the infringing and that such infringement could not have been reasonably foreseen . . .[7]

Under the law prior to this amendment, the writers of poems, short stories, magazine articles or novels were imperfectly protected against the unauthorized performance of their works. It was pointed out to Congress that if poems, short stories, magazine articles or novels were published in book

form first, the copyright statute gave no performance protection. Congress responded with proposed legislation designed to remedy this situation.

The legislation as originally introduced would have granted copyright protection even if a performance was "non-profit" in character.[8] The effects of such legislation would have barred a teacher from reading excerpts from a copyrighted book in the classroom, a minister from reading such materials in the pulpit, or a speaker from doing the same at a civic meeting. When these effects were pointed out, the Bill was changed to limit the copyright protection to *performance for profit* only.[9] As the law reads, therefore, it is not a violation of the copyright law for a broadcasting station operating noncommercially to use copyrighted material, whether in the form of poems, short stories, magazine articles or similar publications. This rule applies to live shows produced by a non-commercial, educational station or to the use of transcriptions of this material.

While some authorities may disagree, this amendment seems to provide that no person may make a transcription or recording of a copyrighted work without payment of royalties. This applies whether or not the purpose of making the recording is "non-profit" or not. Recordings can be made *only* when the permission of the copyright owner has been obtained. The language of the amendment appears to say that neither a commercial or noncommercial station may make a transcription of a literary work without prior clearance from the author, nor may it copy a record or a transcription which it has received without appropriate clearances.

Kinds of Materials Which May Be Copyrighted

The following types of materials may be copyrighted and all commercial stations should make sure they have been cleared before using them in broadcasts.[10]

(a) Books, including composite and cyclopedic works, directories, gazetteers, and other compilations.

(b) Periodicals, including newspapers.

(c) Lectures, sermons, addresses prepared for oral delivery.

(d) Dramatic or dramatico-musical compositions.

(e) Musical compositions, including words and music.

(f) Maps and charts.

(g) Works of art; models or designs for works of art.

(h) Reproductions of works of art.

(i) Drawings or plastic works of a scientific or technical character.

(j) Photographs.

(k) Prints and pictorial illustrations including prints or labels used for articles of merchandise.

(l) Motion picture photoplays.

(m) Motions pictures other than photoplays.

(n) Scripts.

With the exceptions pointed out, educational stations operating strictly on a non-profit basis may use copyrighted materials without securing clearance.

The Doctrine of Fair Use

The limited use of published copyrighted materials for purposes of review and criticism is permissable. Where brief references or quotations from such works are used on educational broadcasts, no problem is involved. Whether there is fair use depends on the nature and purpose of the quotations, the quantity quoted and the extent to which the material might prejudice the use or sale of the original work. Obviously the presentation of a full-length copyrighted play or dramatico-musical in a telecourse on dramatic literature or music appreciation would not be fair use. However, a few short quotations or characterizations used for illustrative purposes would be. No clearly defined rules with respect to fair use can be stated. In *Shapiro, Bernstein and Company, Inc. v. Collier and Son*, the Court stated some general principles that are helpful: "The extent and relative value of the extracts; the purpose and whether the quoted portions might be used as a

substitute for the original work; the effect upon the distribution and objects of the original work." [11]

Protection of Program Ideas

The Courts have held that radio and television ideas which have been reduced to tangible and concrete form and possessing the attributes of novelty and originality are considered protectable interests. Both common law and statutory copyright law afford protection. Should an unauthorized use of a concrete original idea be attempted, the tort feasor may be liable for legal damages and may be enjoined in a court of equity from further use of the program idea or format.[12]

In order for the creator of the program to avail himself of judicial protection he should, at once, reduce to writing the concrete facts regarding the basic ideas and format of the program. This statement should contain the name of the creator of the program, the date of its origination, descriptive facts regarding its format indicating its originality and novelty. The statement should include assertions by the creator that the program idea is the result of independent and creative effort on his part, that he claims a property interest therein and that it is not to be used without his permission.

If the program idea or any scripts, films, or kinescopes pertaining thereto are permitted to be used by others, it should be made perfectly clear in writing that no property rights therein are being given up; and that, under no circumstances, can any use be made without the written consent of the proprietor. Nothing should be done which may be construed as making the program idea available for general use.

Unfair Competition

In an early case, *International News Service v. Associated Press*, 248 U.S. 215 (1918), the Supreme Court extended the doctrine of unfair competition to cover misappropriation of another's goods—"to misappropriation of what equitably belongs to a competitor."

The facts of this case were that the plaintiff and defendant were rival news gathering agencies. The International News Service copied news items from the bulletin boards and early editions of the Associated Press and telegraphed these items to its subscribers on the West Coast.

The Court held that while Associated Press could assert no property right in news as against the general public, as against a competitor, there was a kind of quasi-property right. The Court said that AP had acquired this right in its news

> . . . as the result of organization and the expenditure of labor, skill, and money and which is salable by complainant for money, and that defendant in appropriating it and selling it as his own is endeavoring to reap where it has not sown. . . . Stripped of all disguises, the process amounts to an unauthorized interference with the normal operation of complainant's legitimate business precisely at the point where the profit is to be reaped, in order to divert a material portion of the profit from those who have earned it to those who have not; with special advantage to defendant in the competition because of the fact that it is not burdened with any part of the expense of gathering the news. The transaction speaks for itself, and a court of equity ought not to hesitate long in characterizing it as unfair competition in business.[13]

The doctrine of this case has been extended to enjoin a broadcasting station from pirating news from a newspaper.[14] Also, stations have invoked this doctrine against competing stations who have appropriated to their use without permission the content of sports programs.[15]

While the law of unfair competition has and may be invoked by broadcast stations, Harry Warner has observed that "the public policy which abhors monopolies aided by the pragmatic experience of the courts precludes the wholesale substitution of common law and statutory copyright by the law of unfair competition. It is submitted that the law of unfair competition should be invoked to protect intellectual property when the latter is outside the protective scope of common law and statutory copyright. Thus unfair competition comple-

ments statutory copyright; it cannot and should not be employed where the copyright law provides a remedy." [16]

Right of Privacy

The right of privacy may be defined as the right of every person to "be left alone," to demand that his private affairs shall not be exhibited to the public without his consent. It assures him private existence and protection from public gaze.[17]

Broadcasting stations are under obligation to respect an individual's right of privacy. Under certain conditions, however, an individual may lose this right—for example, by becoming a public figure, or becoming a part of a news event, or by being involved in court proceedings or other official matters of public interest.

Dr. Frederick S. Siebert of Michigan State University has provided a succinct statement on this subject which is helpful and informative:[18]

> Television stations, both commercial and non-commercial, are facing an entirely new set of problems in the area of privacy because of the visual presentation.
>
> All types of stations undoubtedly have the right to broadcast pictorial material about news events and persons in the news. This right, however, does not guarantee to the station the privilege of access with cameras and recording equipment to all types of news events. News events occurring in public places may be reported both by camera and recorder. Public places include streets, parks, and other sites to which every member of the public has access without payment or restriction.
>
> Most news occurrances, however, take place in what might be called semi-private places, such as government buildings, sports arenas, or controlled-admission halls. Television stations may report events occurring in such sites only with the permission of the authority controlling admission to the site.
>
> The right of the individual to protest televising his person depends on whether or not he is currently newsworthy and on whether or not the cameraman has legal access to the site. For example, an educational station may not televise the picture of a person without his

consent unless he is in the news. The station, however, if given permission to televise a football game, does not have to get permission from each individual player or from each member of the audience who might appear on the screen.

It is not possible within the limited confines of this article to deal with the many facets of the problem of right of privacy as it relates to broadcasting. An authoritative and detailed discussion of the subject, however, appears in Chapter 27 of *Radio and Television Rights* by Harry Warner, and is highly recommended to the reader.

Footnotes

[1]61 *Stat.* 652 (1947).

[2]See Warner, Harry, *Radio and Television Rights*, p. 315, for discussion of this point; also see 66 *Stat.* 753 (1952), which may be invoked to protect motion pictures other than photoplays.

[3]*Select Theaters Corporation v. Ronzoni Macaroni Co.*, 59 U.S.P.Q. 288 (DC NY 1943); *Associated Music Publishers v. Debs Memorial Radio Fund*, 46 F Supp. 829 (DC NY 1942), affirmed, 141 F(2d) 852 (2d cir. 1944) *cert.* denied 323 U.S. 766.

[4]*Ibid.*

[5]See Warner, *op. cit.*, pp. 403-404.

[6]ASCAP agreement with members executed in 1941 and expiring in 1965. See Warner, *op. cit.*, for full discussion of these ASCAP contracts.

[7]66 *Stat.* 752.

[8]HR 3589, 82nd Congress, 1st Session, introduced April 6, 1951.

[9]House Report No. 1160, 82nd Congress, 1st Session (1951), accompanied HR 3589.

[10]See Warner, *op. cit.*, Chapter III, "The Subject Matter of Copyright Protection," pp. 40-91, for detailed and authoritative discussion re materials which must be cleared before used on radio or television stations.

[11]*New York Tribune, Inc. v. Otis and Company*, 39 F Supp. 67 (DC NY 1941).

[12]*Stanley v. Columbia Broadcasting System*, 35 Cal. (2d) 653, 221 p. (2d) 73 (1950); *Cole v. Phillips H. Lord, Inc.*, 262 App. Div. 116, 28 NYS (2d) 404 (1941). Note 16, *University of Chicago Law Review* 323 (1949).

[13]39 Sup. Ct. Reporter, 72-73.

[14]*Associated Press v. KVOS*, 80 F (2d) 575 (9th Circuit 1935).

[15]*Pittsburgh Athletic Co. v. KQV Broadcasting Co.*, 24 F Supp. 490. (WD Pa. 1938); Also, *Mutual Broadcasting System, Inc. v. Muzak Corp.*, 177 Misc. 489, 30 NYS (2d) 419 (Sup. Ct. 1941); and *Southwestern Broadcasting Co. et. al. v. Oil Center Broadcasting Co.*, 210 SW (2d) 230 (Texas Civ. App. 1947).

[16]Warner, *op. cit.*, p. 931.

[17]4 *Harvard Law Review* 193, 195; *Melvin v. Reid*, 112 Cal. App. 285, 297 Pac. 91 (1931).

[18]Seibert, Fredrick S., "Clearance, Rights and Legal Problems of Educational Radio and Television Stations." National Association of Educational Broadcasters (1955).

REACTION PROFILES: STUDIES OF METHODOLOGY

By Samuel L. Becker

An oversimplification of the status of communications research might state that we have the tools to investigate the communications channel (such as information theory), and other tools to give us data from which to make inferences about the sources of messages and their intended purposes (such as games theory and content analysis). However, the study of the effects of mass communications is made more difficult by the lack of universally accepted research tools.

It is to help in the forging of such a tool, and not to investigate a specific communications event, that this article has been written. It is an effort to answer the question which is so important to the broadcasting industry: "what is the best way to measure, minute-by-minute, the reactions of an audience to a broadcast program?"

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Introduction

IN the history of science, one of the facts which stands out is the interdependence of growth in knowledge and perfection of tools or methods for investigation. In instance after instance, expansion of knowledge has needed to wait upon new research methods or an improvement in or better understanding of the available methods. The present studies are concerned primarily with achieving a better understanding of one set of methods used in the study of the mass media.

One of the problems which has concerned the producer of various kinds of mass communications for many years has been how to pre-test his message. The production of a series of radio or television programs or films is an expensive matter, not only in the expenditure of money but in time and effort. In many cases, the costs of distribution are even greater than those of production. Because of these factors, there has been strong motivation for finding some means of maximizing the probability of attaining the desired goals, whether these goals were education, entertainment, or the selling of a product. This meant that some method was needed for studying the

reactions to discrete elements within a program, rather than the reactions to their sum. It was not good enough to find out whether people did or did not like a particular television program. The producers needed to know very specifically what it was that was not liked, what was liked, and the reasons in both cases so that weak or mediocre elements could be deleted or made more effective. Merely exposing an audience to a program and then interviewing the audience members seemed to result in only vague or general comments. Once a program was over, it appeared difficult for the audience to recall the specific things which it did or did not like. The solution to this problem seemed to be some means of securing from each member of the test audience a *continuous reaction* to the program *as it was in progress*. With this "profile" of reactions as a guide, interviewers could probe for the reasons for specific reactions. In some cases, the sections of programs which received notably high or low responses could be replayed to aid the recall of the respondents. In any case, the profile could facilitate focused interviews about reactions.[1]

Many methods of securing these continuous reactions or profiles have been used. Among the earliest were the Wechsler psychogalvanograph used by Dysinger and Ruckmick in one of the Payne Fund studies at the State University of Iowa,[2] a paper and pencil technique devised by Lazarsfeld in Vienna, the later Lazarsfeld-Stanton Program Analyzer used by the Columbia Broadcasting System and the Office of Radio Research, later the Bureau of Applied Social Research, at Columbia University,[3] and the Horn Program Barometer developed at Iowa and later at the Young and Rubicam advertising agency.[4] There are many more recent methods which have been developed, though all are variations of the paper and pencil technique, the program analyzer or barometer, or the measurement of a physiological concomitant of emotional experience such as respiration, blood pressure, pulse rate, or sweat-gland activity. The most extreme devitation from these early devices which has appeared in recent years is the popularly termed "wiggle meter" developed by Kretsinger at the University of Oregon.[5]

With each of these methods of securing response profiles, the basic procedures are similar. The audience members are instructed in the manner in which they are to respond. They are told to push a button or to turn a dial when they are interested or not interested, or when they like what they are seeing or when they do not like it, or when they feel that they are learning from it or not learning from it, etc. If a paper and pencil technique is being used, members of the test audience are told to indicate their reactions with a mark on a chart each time a number is flashed on a screen. If one of the physiological measures is being used, the paraphernalia is attached to each respondent and he is asked simply to relax and view the program. In the case of the wiggle meter, the paraphernalia is attached to the chair in which the respondent sits.

The difficulty with all of these methods has been the paucity of research on the methods themselves. Almost every reseacher in the country who is carrying out research on reaction profiles is using either a different type of device or a different procedure or, in most cases, both. Little is known of the effect of different types of procedures with different audiences and different subject matter. Little is known of the effect of using different types of devices. In applied research, where one's only goal is the improvement of a specific program or series of programs, this may make little difference. However, as we attempt to make broader generalizations which have meaning beyond a particular series, we need to know whether all procedures used to secure the data upon which generalizations are based are measuring the same or different concepts. The goal of our research in this area at the State University of Iowa is to gain a better understanding of these various methods through experimental comparisons of procedures and devices. The studies which are here reported are the beginning of what we hope will be a systematic and fairly complete study of this field.

The present studies deal with two problems. One is a comparison of two methods of using the same device for recording

responses; the other is concerned with the effects of using two completely different devices.

The primary purpose of the first study was to test the hypothesis that the less effort it takes to indicate a positive reaction to the stimulus, the more positive the reaction of the audience will be. A secondary purpose of this study was to secure data on the validity of the push-button method of securing audience responses by comparing the overt responses made during a program with verbal responses made following the program.

The second study was designed to compare response profiles obtained when respondents note their reactions to a stimulus continuously by pressing or releasing a push-button to those obtained when respondents mark their reactions each thirty seconds, either positive or negative, on a sheet of paper.

Previous Research

No previous studies were found which experimentally compared different methods of using one device or different devices. Most methodological studies to date have examined the effect of different word pairs used to identify the scale on which the audience is to respond. Paranteau,[6] using word pairs which have been found to be heavily loaded on different dimensions of connotative meaning (by the developers of the Semantic Differential technique[7]), found indications that word pairs with heavy loadings on different dimensions of meaning caused respondents to react to different aspects of the films. Subjects who were told by the experimenter to respond to the film in terms of the "worthwhile-worthless" continuum seemed to be reacting in large part to the content or educational aspects of the film. Those who were told to respond in terms of "fast-slow" seemed to be reacting primarily to delivery and production elements. The third word pair utilized was "weak-strong." Results with this pair proved to be quite unreliable so that no consistent pattern could be found for the aspects of the film to which subjects were responding. Hallonquist and Suchman[8] found little difference between profiles obtained

with a "like-dislike" scale and those obtained with an "interest-disinterest" scale. Twyford[9] found a slight negative correlation between profiles obtained with a "like-dislike" and "I am learning-I am not learning" scales. Miller and Philbrick[10] compared six sets of response words for obtaining profiles of pupil reactions to classroom teaching. They compared "understand," "meaning," "importance," "interest," "involvement," and "want." In each case, a respondent had a choice of five responses or degrees of response. For example, for "want" he could respond to "getting just what I want," "getting mostly what I want," "all right," "only getting a little of what I want," or "not getting anything out of it that I wanted." The researchers concluded that the "want" set of possible responses resulted in "the best single index of communication that a teacher can get quickly and accurately."

Responding versus Not Responding to Indicate Interest

The sample. Thirty-six high school students attending the 1957 summer forensics workshop at the State University of Iowa made up the sample for this study. In general, these were students who were active in debate, discussion, and oratory in their respective high schools. They were students who, as a result, probably tended to be above average in intelligence. These students were matched as much as possible on the basis of sex, grade they would be in high school during the coming year, interest in aviation, and rural *vs.* urban residence. Individuals from each matched pair were then randomly assigned to one of two treatment groups.

The films. The stimuli were two twenty-nine minute films selected from a series of thirteen which had been produced by the State University of Iowa Division of Television, Radio, Film for distribution to educational television stations. The series, called "The Secret of Flight," featured Dr. Alexander Lippisch, noted aerodynamicist. One of the films selected was concerned with technical aspects of flight, the other dealt with the history of flight.

Data collection. Approximately one week prior to the experiment, in July, 1957, each respondent completed a ques-

tionnaire which provided the data for matching individuals on the bases noted above.

Both groups saw the technical film first, each on succeeding days. While viewing the films during the experiment, each subject held a box which was about half the size of a package of cigarettes. Each individual in Group I was told to press the button on his box when he felt interested in what he was seeing and to hold the button down as long as he remained interested. Each individual in Group II was told to press the button when *not* interested and to hold it down as long as he remained uninterested in what he was seeing. He was told to release the button when he was interested.

When each group saw the history film, two days after seeing the technical film, respondents were given the reverse directions. This time, Group I was told to press when *not* interested, Group II was told to press when interested. This resulted in a simple latin square design.

Responses were recorded by an Esterline-Angus 20-pen recorder on a constantly moving paper graph. This gave a permanent record of the precise moment at which each respondent pressed his button and how long he held it down.[11]

Following the showing of the second film, respondents were asked questions concerning these methods of indicating their reactions to films. Following this, each group was broken into sub-groups with four to five subjects in each and further probing was done on these questions.

Treatment of data. The number of ten-second intervals were tabulated in which each respondent indicated interest. For each film, this included eighteen subjects indicating interest by pressing buttons and eighteen subjects indicating interest by not pressing buttons. The portion of each film analyzed (all but closing titles) was 28 minutes and 10 seconds in length. This means that there were a maximum of 169 ten-second intervals in which each subject could respond.

Differences in interest scores obtained by respondents pressing or not pressing the buttons were tested with an analysis of variance.

Results. Higher interest scores were obtained when respondents showed interest by not pressing buttons. This can be seen in Table I. As the Table shows, this difference was

TABLE I

Mean Number of Interest Responses by Program and Response Type

	Press When Interested	Press When Not Interested
Technical film	86.11	125.38
History film	110.27	128.44

consistent for both programs, though it was more pronounced in the reactions to the technical program. When these data were tested with an analysis of variance, the results of these two methods of showing response were found to be significantly different.

Charts were constructed showing the profiles obtained from each group for each film. On each, the profiles of the responses obtained by each response method were superimposed. Although too large physically to be reproduced legibly, they visualize what the analyses have shown: that more favorable scores were obtained when respondents indicated interest by not pushing the response buttons. These graphic profiles show something else, however. Some research and much speculation has centered about the question of "lag" between feeling and reaction. These profiles probably represent a rough index of this "lag."

Peaks of the no-push group are not only higher than those of the push group, they also tend to be consistently ahead. A respondent is not only more likely to *release* a button to indicate interest than to *push* a button, he is also more likely to do it sooner.

In the questionnaire administered following viewing of the second film, subjects were asked whether they found it more natural to push the button when *interested* or to push it when *not interested*. Of the total, 62.5 per cent felt that it was easier to push when *not interested*, which would appear to be consistent with the results of the analysis of variance. The results, when broken down by groups, seem to indicate that there is a tendency for respondents to favor the reaction method which they learned first. For Group I, which reacted first by pushing when interested, this tendency seemed to counterbalance the fact that pushing when not interested was more natural. This can be seen in Table II which shows the responses of Groups I and II to this question. A Chi-square test of these data indicated that the difference between groups on

TABLE II

Number of Students Finding Each Response Method "More Natural"

	Group I (First Pushed When Interested)	Group II (First Pushed When Not Interested)	Total
Interested	10	5	15
Disinterested	10	15	25

this question was not significant ($\chi^2 = 2.67$). However, note must be made of the small sample upon which this result is based. A Chi-square test with cell frequencies of this magnitude is questionable.

In order to obtain some measure of the validity of this method of securing audience responses, following each film each respondent was asked whether he found "today's program (a) very interesting, (b) somewhat interesting, (c) not very interesting, (d) dull." Taking the results from one film at a time, the subjects were divided into four groups, based on their responses to this question. An analysis of variance of interest scores was then run to see whether there were significant differences between these groups on push-button scores.

For both programs, differences were found to be significant. However, since we are primarily interested in whether push-button interest scores can differentiate between each of the four groups, *t*-tests were applied to the differences for each pair of groups. The results for the history program are shown in Table III, for the technical program in Table IV. It is interesting to note that the same results were found for

TABLE III

Table of Significant Differences between Groups on Push-button Interest Scores for History Program

Group	Mean	N		b	c	d
a —	158.00	3	a	27.44	75.80*	83.50*
b —	131.56	23	b		48.36*	56.06*
c —	83.20	5	c			7.70
d —	75.50	4				

* = Significant difference by *t*-test

TABLE IV

Table of Significant Differences between Groups on Push-button Interest Scores for Technical Program

Group	Mean	N		b	c	d
a —	129.83	6	a	5.26	47.43*	51.83*
b —	124.57	14	b		42.17*	46.57*
c —	82.40	10	c			4.40
d —	78.00	6				

* = Significant difference by *t*-test

the data from each program. Significant differences were found between each pair of means except between groups *a* and *b*, and between groups *c* and *d*. That is to say, mean push-

button interest scores were not significantly different between those who said a program was "very interesting" and those who said it was "somewhat interesting" or between those who said it was "not very interesting" and those who said it was "dull."

Push-Button vs. Paper and Pencil Methods of Securing Response Profiles

The sample. The results reported below are based upon samples from three independent populations: fifth grade students, elementary school science teachers, and mothers of preschool children. In each case, an essentially random method was used to assign individuals within each population to one of two treatment groups. One group from each population responded to a television program by means of a paper and pencil method (to be described below) while the other group responded to the same program by means of a push-button method.

The first population sampled was the population of mothers of three-to-five year old children living in the married student housing areas at the State University of Iowa. These subjects were atypical of the universe of young mothers in that all were wives of college students or instructors, that they tended to be slightly above average in education, and that they lived in a somewhat unique community, a college married student housing area. These factors appear to have no *prima facie* relationship to the variables examined in these studies and should raise no serious question about the generality of the specific results considered in this paper. From the total sample of 34 mothers, 18 were assigned to the group which responded to the television program by means of push-buttons, 16 were in the group which responded by means of the paper and pencil technique.

The fifth grade students used in this study comprised the entire fifth grade population of the University Experimental School in Iowa City who were present in the school on the day of testing. This class was randomly divided into one group of 15 and one of 14. Again one might raise the question of

the typicality of students in an experimental school of this type. It was the opinion of their teacher and the principal of this school that these students are undoubtedly more accustomed than most fifth grade students to participating in experiments but that this should have no differential effect on their reactions to the two methods of responding used in this study.

There were 35 elementary science teachers who participated in the study. All were attending a science teacher's workshop at the State University of Iowa at the time of this experiment. Twenty of these subjects responded to the program by means of the push-button method; 15 responded by means of the paper and pencil method.

Each of the adult subjects was paid a small fee for his participation in the study.

The programs. The groups of mothers responded to a thirty minute television program called *Kindergarten Time.* Its target audience was pre-school children of kindergarten age. The groups of fifth grade students and elementary science teachers responded to a thirty minute television program titled *Air.* It was one of a series of science programs designed for television presentation to children unable to attend formal classes in a community. Its level appeared most suitable for fifth grade youngsters. In each case, the television program was projected as a conventional 16 millimeter motion picture.

Data collection. Data from the mothers were collected on May 27, 1958. One group participated from approximately 7:00 to 8:15 p.m., the other from 8:30 to 9:45 p.m. When the first group arrived, each found on the armrest of her seat a long sheet of paper marked off in 60 consecutive numbered intervals with INTEREST written periodically across the top and DISINTEREST across the bottom. These were the in-instructions read (and demonstrated on the blackboard) to this first group of participants prior to their viewing of the program:

> In a moment you will see a film which was designed for pre-school children and children of kindergarten age. It is

> felt that perhaps a venture of this sort might later serve as a substitute in areas where kindergarten is not available. What we would like you to do this evening is to tell us where you think your child might be interested or disinterested in this film. In effect, we are asking you to put yourself in the place of your own pre-school child. You will find on each of your seats a long piece of paper on which you are to register your feelings concerning the film. (At this point, the subjects were shown a drawing of the paper and the method of marking was explained on the blackboard.) The film, which runs 30 minutes, will be broken down into sixty 30-second intervals and we would like you to register either a disinterest or interest reaction every 30 seconds of the film. Throughout the running of the film a number corresponding to the interval will be flashed on the small screen adjacent to the projection screen. You are to mark your reaction in the corresponding column. Remember, you are to make a judgment every 30 seconds. Obviously, such a method cannot measure degree of interest or disinterest so we ask you to think of this as being on a continuum. Any time you feel your child would tend in either direction from the midline, please register in that direction.[12]

Consecutive numbers from 1 through 60 were flashed on the small screen by means of a 2″ by 2″ slide projector. Each 30 seconds, the succeeding number was shown for a period of approximately 10 seconds. (In earlier tests of this method of securing audience response, it was found that 30 seconds was an interval at which adults indicated that they found no difficulty responding.)

When the second group of mothers arrived, each found on the arm rest of her seat the push-button mechanism described earlier. This group received essentially the same instructions as the first group of mothers except in regard to the specific method of response. The following was substituted for the instructions on the paper and pencil method:

> The down position of the button has been designated disinterest and the up position interest. Remember, if at any point you feel the child is disinterested, please push the button and hold it until you feel your child's interest would rise. A momentary push of the button

registers only momentary disinterest, therefore the button has to be held down. Any time the button is not held down you are indicating that you feel your child would be interested. Remember, down means disinterest and up means interest.

Data from the fifth grade students were collected on May 19, 1958. The first group, which responded by means of the paper and pencil method, viewed the film almost immediately after school opened in the morning. The second group, which responded by means of the push-button method, viewed the program approximately an hour later. These groups were given the same type of instructions as those given the corresponding groups of mothers except that each student was told to indicate his own interest, rather than that of someone else. We told each student that we wanted him to tell us, by whichever response method he was using, which parts of the program he found interesting and which he did not find interesting.

The elementary science teachers were tested on July 29, 1958. They received comparable instructions to the students with two exceptions; they were told to indicate what they felt would be interesting to or not interesting to fifth grade students in a science class and the group which responded by the push-button method was told to press their response buttons when they felt that students would be interested, to release them when they felt they would not be interested. (Students had been told to push to indicate disinterest.)

Treatment of data. Since the paper and pencil responses were made each thirty seconds, the continuous graphs recorded by the push-button method were tabulated by thirty-second intervals. In the latter case, there were obviously many thirty-second intervals in which a subject changed his response from interest to disinterest or vice versa. In such cases, the response was considered to be "interest" if a subject had indicated interest for the greater portion of the thirty seconds; it was considered to be "disinterest" if a subject had indicated disinterest for the greater portion of the period.

The response profiles for each pair of groups from the same population were compared by superimposing them on a single graph. A *t*-test was used to test the difference in mean number of disinterest responses between each pair of groups from the same population.

Results. When graphic profiles were constructed, it was apparent that the mothers who indicated disinterest by pressing a button appeared more hesitant to begin disinterest predictions than those whose responses were "forced" by the paper and pencil method. The mean number of disinterest responses for the entire program was only 7.56 for these push-button mothers compared to a mean of 12.88 for the paper and pencil mothers. This difference was significant at the 5 per cent level of confidence, $t = 2.02$. The same was true of the fifth grade students who responded by these methods to the science film. The machine respondents began indicating disinterest later, and they averaged only 9.93 negative responses compared to 17.67 for the paper and pencil respondents. A t of 2.37 was found for this difference, significant at the 5 per cent level of confidence. However, the science teachers who responded by the machine method, but who pressed for interest rather than disinterest, did not have this lag in beginning to respond nor a significant difference in mean number of disinterest responses, 17.90 compared to 18.73 for the paper and pencil respondents. The *t*-ratio for this difference was less than unity. (Unfortunately, it would be impossible to read these graphic profiles if they were reduced in size to fit on a JOURNAL page.)

Further evidence of the increased similarity of responses obtained by the paper and pencil and push-button methods when the respondents using the latter method push to indicate interest is provided by the Pearson product-moment coefficient of correlation for each of these sets of responses. For each pair of groups, the number of disinterest responses from the paper and pencil group were correlated with the number from the push-button group. The responses of the two groups of mothers did not even correlate significantly ($r = .206$). The two groups of children correlated significantly with an r of

.334. The two groups of teachers also correlated significantly, with an r of .657.

It might seem a reasonable assumption, as a result of the above, that respondents will not hesitate to take an overt action if it is to indicate interest but that they will hesitate to take an overt action to indicate disinterest. The problem does not arise with the paper and pencil method because overt responses are forced. Since push-button response procedure and respondent type were confounded in the above studies, of course, this assumption will need further testing.

Conclusions

1. The hypothesis of the first study reported was confirmed. Given the same device for recording responses, the less effort it takes to indicate a positive reaction to the stimulus, the more positive the reaction of the audience will be.

2. On the basis of the second study, there appears to be little difference between push-button response profiles and paper and pencil response profiles if subjects using the first method are pushing a button to indicate a positive response and releasing to indicate a negative response. However, if respondents are asked to push to indicate the negative response, two major differences will be found. During the early section of the program, the push-button respondents will be hesitant to indicate a negative response and, even more clearly, there will be far fewer negative responses throughout the program. It should be pointed out that this second conclusion is far more tentative than the first.

3. With an off-on push-button device for obtaining response profiles, there is a tendency for respondents to find it more natural to push to indicate a negative response and to release to indicate a positive response. However, this tendency can be counterbalanced by previous training or experience in the reverse method of responding.

4. On the basis of the above results and our experience with these methods of obtaining audience response profiles, it is our opinion that the paper and pencil method is advantageous for many research purposes. It is cheaper in initial

capital outlay, it is easier to set up, easier to tabulate in the manner done for this study and, as shown above, results in a maximum response. The major advantage of the push-button method with an automatic recording mechanism is that the researcher has the group profile immediately. This provides him with cues for the group interview which generally follows the program showing. It helps to focus the interview on aspects of the program which received especially positive or negative responses.

Footnotes

[1]Robert K. Merton, Marjorie Fiske, and Patricia L. Kendall, *The Focused Interview.* Glencoe, Illinois: The Free Press, 1956, pp. 27-31.

[2]Wendell S. Dysinger and Christian A. Ruckmick, *The Emotional Responses of Children to the Motion Picture Situation.* New York: Macmillan, 1933.

[3]Tore Hallonquist and Edward A. Suchman, "Listening to the Listener," in Paul F. Lazarsfeld and Frank Stanton, eds., *Radio Research, 1942-1943.* New York: Duell, Sloan and Pearce, 1944, pp. 265-334.

[4]Norman C. Meier, "Measurement of Response to Radio Programs," prepared by Young and Rubicam, Inc., Summer, 1945, in the agency files.

[5]Elwood A. Kretsinger, "Gross Bodily Movement as an Index of Audience Interest." *Speech Monographs,* Vol. XIX, 1952, pp. 244-248.

[6]Zoel Parenteau, "The Effect on Audience Response Profiles of Varying Criterion Words." The State University of Iowa, Iowa City, Iowa, 1958 (Unpublished Master's thesis).

[7]Charles E. Osgood, *et al., The Measurement of Meaning.* Urbana, Illinois: The University of Illinois Press, 1958.

[8]Hallonquist and Suchman, *op. cit.,* pp. 316-318.

[9]L. C. Twyford, "A Comparison of Methods for Measuring Profiles of Learning from Instructional Films." The Pennsylvania State University, University Park, Pennsylvania, 1951 (Unpublished Ph.D. dissertation).

[10]D. C. Miller and W. W. Philbrick, "Measurement of Group Learning Process by Use of the Interactional Telemeter," *American Sociological Review,* Vol. XVIII, 1953, p. 184.

[11]Eugene E. Rydahl, "Preliminary Study of a Portable Recorder of Responses of Theatre Audiences." The State University of Iowa, Iowa City, Iowa, 1955 (Unpublished Master's thesis), pp. 3-7.

[12]In a test of the ability of adults to predict the interest of children in a television program, the results obtained from these groups of mothers and profiles obtained from personnel trained in child psychology were compared to the observed interest of children in the program. The reactions of the fifth grade students and the science teachers were also compared. The results of these comparisons are to be reported in "Can Adults Predict Children's Interest in a Television Program?" by Samuel L. Becker and Glenn Joseph Wolfe, to be published in a forthcoming book edited by Wilbur Schramm and published by the University of Illinois Press.

THE STRUCTURE AND CONTENT OF MUSIC CONTINUITY

By Edward W. Borgers and Allen E. Koenig

Since the advent of television forced a drastic reduction in program offerings, most radio stations have found some variation of the "music and a little news" formula profitable. However, there is much guessed but little known about the popular presentation of popular music. Questions of continuity style, music selection, disc jockey personality and program scheduling are answered for the most part by frequent empirically (as opposed to scientifically) determined decisions regarding minor changes of format on each of the many radio stations programming essentially the same content. The basic question is: "what are those small differences in style and format that lead to success or failure, popularity or unpopularity, of a given disc jockey program?" The present study analyzes only one aspect of this problem, that of the content of written continuity for popular music, while recognizing the presence of myriad other factors as yet unexplored.

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Introduction

MOST text books that discuss various types of radio and television writing give some attention to the type called continuity writing. (For the purpose of this article, *continuity* is defined as the words on a given broadcast program that introduce, connect the parts of, and conclude the different elements in a given program. In a program devoted primarily to music these words are *music continuity*.) Most books offer brief advice regarding the content and style of continuity writing. However, there seems to be little in reported research that either confirms or disproves this advice.

Fully to determine the actual practice of contemporary continuity writing in the United States is a task far too imposing for the modest initial study recorded in this article. Because of the writers' geographical location, they chose to begin by exploring the present practice of commercially-produced popular music (disc-jockey) continuity writing in Los Angeles. They have further limited the study to music continuity on certain high-rated and low-rated Los Angeles radio

TABLE I

High-Rated and Low Rated DJ Programs in Los Angeles, December, 1959

No.	Time	Day	High-Rated DJ Program	Station	Pulse Rating	No.	Low-Rated DJ Program	Station	Pulse Rating
1.	8:00 AM	M-F	Hayes	KFWB	6.5		Replaced*		
2.	10:00 AM	M-F	Yocam	KFWB	6.4		Replaced*		
3.	7:45 AM	M-F	Wittinghill	KMPC	6.0	1.	Allen	KRLA	1.0
4.	5:00 PM	M-F	Field	KFWB	5.7	2.	O'Neill	KRLA	1.3
5.	1:00 PM	M-F	Quillan	KFWB	4.9		Replaced*		
6.	10:00 AM	M-F	Cook	KMPC	4.3	3.	Elwell	KRLA	1.1
7.	6:00 PM	M-F	Reed	KFWB	4.1		O'Neill (See 2)		
8.	9:00 PM	M-F	Ballance	KFWB	3.0	4.	Wagner	KHJ	1.3
9.	7:00 PM	M-F	Carroll	KMPC	3.0	5.	Harris	KRLA	1.1
10.	6:00 PM	M-F	Compton	KHJ	2.4		O'Neill (See 2)		
11.	11:15 AM	Sat	Yocam	KFWB	5.6		Replaced		
12.	9:45 AM	Sat	Hayes	KFWB	6.1	6.	Wahl	KPOP	1.3
13.	10:15 AM	Sun	Jarvis	KLAC	5.3		Replaced*		
14.	4:15 PM	Sun	Reed	KFWB	4.8		Replaced*		
15.	4:00 PM	Sat	Field	KFWB	4.8	7.	MacKinnon	KABC	1.1
16.	9:00 AM	Sun	Quillan	KFWB	4.3		Replaced*		
17.	6:00 PM	Sun	Ballance	KFWB	3.8		O'Neill (See 2)		
18.	8:30 AM	Sat	Wittinghill	KMPC	3.8		Allen (See 1)		
19.	12:00 M	M-F	Weed	KFWB	3.8		No comparable show		

*Replaced between *Pulse* survey in December and monitor taping in June.

music programs. But in a field where so little at present is known, even limited information may be useful.

Method and Results

The December, 1959, issue of *Radio Pulse*[1] listed the 25 most popular radio programs in Los Angeles at that time. 19 of those programs were disc-jockey music shows: 14 on KFWB, 4 on KMPC, and 1 on KHJ. Identified in this study as Group "High," these high-rated programs are listed by date, station, program, day, time, and rating according to *Pulse* in Table I.[2]

The location of a sample of low-rated programs for Group "Low" was more difficult. Each of the popular shows was listed in the order of its popularity at that quarter hour when it had the highest rating. Then the investigators searched through the same quarter hour segment for the disc-jockey show with the *lowest* rating. In four cases, however, the weaker show had already been banished from the air before the investigators could get to it, and its replacement had not yet received a rating. Occasionally the low-rated show opposite one high-rated show would also be the low-rated show opposite a different high-rated show. In one case (Secrest), the regular jockey was on vacation at the time the samples were taken, but the investigators assumed that his replacement (Wagner) would use a similar structure and content. In one case no comparable show was listed for the same quarter hour. Hence, seven low-rated shows were compared to 19 high-rated shows. (The investigators recognize that the three-months gap between the samplings of high-rated continuity and those of low-rated continuity is undesirable. Interest in comparing the second sample with the first developed as the review of the first sample was coming to conclusion. Caution should certainly be taken in interpreting these comparisons.) For each program, the investigators tape-recorded the first five minutes and the last fifteen minutes for one day. From this tape, the continuity was transcribed into typed copy. That copy then became the basis for further study.

TABLE II

Opening Frame Analysis

Order of Appearance	Music Theme or Fanfare		Greeting		Series Title		Series Description		Today's Program		Jokes		Other	
	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7
1st	14	9	4	1	1	1	..	1	..	..	..	..	..	..
2nd	2	..	3	..	..	2	..	5	..	1	1	..	1	..
3rd	1	1	8	7	..	..	1	1	..	..	3	1	3	3
4th	1	..	..	..	..	1	4	1	..	..	1	..	2	1
5th	..	..	..	..	..	..	1	..	1	..	2	..	2	1
6th	1	..	..	..	..	..	1	..	..	..	..	..	..	..

Whether the copy for each program was written or extemporaneous was determined by a phone call to each station. The continuity for 10 of the 19 most popular programs was written in advance. For the other 9, continuity was ad-libbed. In other words, so far as this sample is concerned, practice was about 50-50. In the "Low" group, all programs were ad-lib.

The part of each continuity sample that appeared to be introducing the program as a whole was arbitrarily identified as *opening frame*. The part in each sample that appeared to be concluding the program as a whole was identified as *closing frame*. The part of each sample that seemed clearly to refer to a selection just performed was identified as *post-copy*. All other copy was identified as *pre-copy*.

The investigators analyzed each opening frame according to its actual content: music, series title or "billboard," a greeting, a description of the series, a description of the day's program, jokes, and "other"—a term covering unclassifiable miscellany. Each of the following tables shows not only *what* items appeared, but also in what *order* they appeared.

In both the "High" and the "Low" groups, most of the opening frames contained music, a greeting, and a description of the series. However, jokes were about twice as frequent in the "High" as in the "Low" group.

The closing frames were similarly categorized under the following headings: theme, announcer's name, title of series, a declaration ("All music was chosen by you"), a teaser or promotional announcement for other programs, a farewell, a statement of temperature, time, or date with station identification (ID), and jokes. The announcer's name often appeared in conjunction with other elements. The habitual declaration in the "Low" group—unlike that in the "High" group—was a statement relating to source of the phonograph records played during the program. As "Low" group monitoring tapes were made in June, 1960, and "High" group monitoring tapes in March, one may account for the new wording by the increased enforcement of pertinent FCC regulations.

TABLE III

Closing Frame Analysis

Order of Appearance	Music		Announcer's Name		Series Title		Declaration		Teaser or Promotion		Farewell		Time, Weather, Date, ID's		Jokes	
	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7
1st	2	..	..	..	..	..	..	..	3	3	2	7	2	..	3	2
2nd	4	..	..	..	..	1	1	6	3	2	4	..	1	..	..	2
3rd	1	2	..	..	1	..	..	..	7	4	..	..	..	..	..	..
4th	5	..	3	..	..	..	..	..	1	2	3	..	..	..	..	..
5th	3	2	..	..	..	..	4	1	..	..	1	..	..	..	..	..
6th	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..

In both groups the closing frame usually included music, a declaration, a teaser or program promotion, a farewell, and some jokes. The announcer's name usually appears somewhere in the closing frame. Station ID's are occasionally included. The elements have no consistent particular sequence.

Pre-copy was analyzed according to title, composer, name of performers, description of music, gossip, ID's, and jokes. ("Gossip" here means incidental remarks about people.) In the "High" group, 4 out of 19 programs had no pre-copy; in the "Low" group 2 out of 7 programs had no pre-copy. Aside from the frames, the words of those programs were all either commercials or post-copy. Reports on traffic conditions appeared in 2 instances. In the remaining samples, the elements fell according to Table IV.

In both groups, then, pre-copy was commonly omitted. Where it appeared, it usually included title of composition, composer, name of performer, description of music, gossip, ID's, and jokes—in no particular order. Again the proportion of jokes is greater in the highly-rated programs than in the low-rated shows.

A similar analysis of post-copy revealed the most common elements to be composition title, name of performer, description of music, time, temperature and date ID's, and jokes—in both groups. But once again the most striking contrast is in the greater proportion of jokes in the "High" group over the "Low" group.

When an entry indicated that a given piece of continuity contained "description of music," the investigators further explored the nature of that description. For purposes of analysis, these descriptions were broken down into three headings. *General* information referred to statements that could be made of perhaps as many as half the compositions on a given series; e.g., "Here's a swinging little number." *Specific* information referred to statements that presumably require the writer to read something or study something before he can make the statement; e.g., "Number six on this week's top twenty" or "This platter was the first since Elvis'

TABLE IV

Pre-Copy Analysis

Order of Appearance	Title		Composer		Name of Performer(s)		Description of Music		Time, Weather, Date, ID's		Jokes		Gossip	
	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7
1st	2	1	..	..	10	10	14	2	1	..	3	..	5	4
2nd	10	..	1	..	12	..	2	..	2	2	3	1	1	..
3rd	9	..	..	..	2	..	1	..	3	1	3	1	2	..
4th	2	..	1	..	..	..	1	..	2	..	1	..	..	2

stint in Germany." *Particular* information referred to statements that presumably required the writer to listen to the performance or study the score before he could make the statement; e.g., "Notice the cello counter-melody racing around downstairs—a real novelty in pop music arrangements."

Among the "High" group 18 of the 19 samples contained at least some sort of music description. In 7 of the 53 instances of music description the information was general; in 46 instances it was specific. In no case was the information particular as the term is here defined.[3] In 19 instances the information appeared in pre-copy; in 34 cases it appeared in post-copy. In the low-rated group the music descriptions were general in 7 cases, specific in 30 cases, and particular in none. In 6 instances the information appeared in pre-copy; in 31 instances it appeared in post-copy.

Summary and Conclusion

A study of 19 samples of music continuity from top-rated radio disc-jockey shows in Los Angeles, plus 7 samples from low-rated disc-jockey shows in the same city, indicated the following: (1) Of top-rated shows, about half the continuities were written in advance. (2) With both groups, most opening frames contained music, greeting, and description of program series, with frequent jokes. (3) The closing frame usually included theme music, announcer's name, series title, a declaration, a teaser, a farewell, program promotion announcements, and jokes. (4) Pre-copy most commonly included title, name of performer, description of music, gossip, jokes, and ID's. It was not uncommon to omit pre-copy, even throughout a whole program. (5) Post-copy most commonly contained composition title, name of performer, description of music, ID's, plugs, record data, gossip, and jokes. However, in high-rated shows the joke appears substantially more often than in low-rated shows. (6) When music was described in these continuities, the information was usually specific, and appeared more frequently in post-copy than in pre-copy. In low-rated shows the absence of any such information was more common than in high-rated shows.

TABLE V

Post-Copy Analysis

Order of Appearance	Composition Title		Composer		Composition Date		Performer Name		Music Description		Performer Biog.		Record Data		Gossip		ID's		Jokes		Promotional Announcements	
	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7	High N=19	Low N=7
1st	15	9	1	..	1	..	17	11	18	14	..	4	..	..	2	..	4	1	1	..	2	2
2nd	15	15	1	..	..	..	23	13	7	7	2	..	4	..	2	..	8	1	3	1	2	3
3rd	16	7	..	..	..	..	5	3	8	9	..	..	8	7	2	..	7	4	3	..	4	4
4th	6	5	..	..	..	..	3	6	..	..	..	..	2	..	..	..	4	6	2	1	1	3
5th	..	..	..	..	..	..	..	..	..	2	1	..	..	..	1	..	5	3	1	..	2	4
6th	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	6	2	1	..	2	1

NOTE: In the low-rated group, the declaration regarding source of records appeared 4 times.

The only positive assertions that can be made in conclusion are those above. But it is at least tempting to infer a cause and effect relationship between the three most striking differences in structure and content between the high-rated and low-rated music continuities studied. These differences suggest that the chances of producing top-rated copy substantially improve when the copy is written in advance, and that music continuity increases in listener interest as it adds specific information and jokes.

Does this imply that more humor and more specific information are the key to higher ratings on the disc jockey show? No. Many other factors may be involved, and they may be far more important than anything relating to structure and content in music continuity. Style (currently under study) may be far more significant. The manner of delivery by the jockey himself, the choice of records, the general image of the station, the length of time the program has been on the air, and the number and types of commercials are a few others. All that this study establishes is that—so far as structure and content is concerned—the trends to humor and specific information are noticeable ones among higher-rated shows.

The investigators hope that this study may be useful in two ways: (1) it lists in specific detail the various elements that commonly appear in today's music continuity. Such a list is not—to the investigators' knowledge—available in text books discussing continuity writing. (2) It offers two specific suggestions—that copy should be written in advance and should include an increasing amount of specific information and jokes—that may increase favorable listener response to that continuity.

Footnotes

[1]The selection of this particular rating service was on the basis of availability, not evaluation.

[2]Eight of these nineteen high-rated programs were drawn from a "Saturday-Sunday" *Pulse* list. Six of these eight were also on the "Monday-Friday" list. This duplication follows *Pulse's* own method of listing top shows.

[3]Query: Might listener interest be even greater if the music description added some *particular* as well as *specific* information?

BOOKS IN REVIEW

THE CHURCH IN THE WORLD OF RADIO-TELEVISION. By John W. Bachman. New York: Association Press, 1960. xvii + 191 pp. $3.50.

In February, 1958, the National Council of Churches of Christ, on behalf of the thirty-two Protestant and Eastern Orthodox communions which it comprises appointed a Study Commission on the Role of Radio, Television, and Film in Religion. It was my privilege to serve as a member of that Commission and participate in its deliberations over a two-year period.

As Dr. R. H. Edwin Espy, Secretary to the Commission, has pointed out in the Foreword, much of the thinking of the Study Commission is reflected in this book. Professor Bachman was an active member of the Commission, and, though retaining full freedom and authority, he has done an outstanding job of presenting the basic issues with which the Commission was concerned.

Professor Bachman states at the beginning of this provocative volume that the church's responsibility in the world of broadcasting goes far beyond the production and distribution of a few religious programs. It extends to all the programs and policies of the media.

Current attitudes of many churchmen toward radio and television generally reveal a misunderstanding of the media or Christian faith or both. Their attitudes, says the author, may be classified as "either daydreams, nightmares, or illusions." The daydreamer is the uncritical enthusiast who views broadcast media as "mysterious and fantastically powerful means of evangelism" and he usually advocates the use of the same techniques to sell religion as are used to sell soap. On the other hand, there are those who indiscriminately denounce the media, describing their output as "deceitful, irresponsible, standardized, manipulative, sensationalistic, escapist, and materialistic, causing many people to use the media as a scapegoat for all the evils of society from juvenile delinquency to political immaturity." There is the third group that views the media as neutral, to be used for good or evil, depending on the user and his purposes.

Professor Bachman points out that the churchman's view "should be more realistic than a daydream, less fantastic than a nightmare and clearer than an illusion." The remaining alternative, as he sees it, is *vision*. "The media are seen to be neither magically beneficial nor inevitably degrading; they are part of an imperfect world, subject to perversion but also subject to reclamation and enlistment in fulfillment of the Creator's purposes. Like the rest of the natural world they offer beauties

and mysteries to be explored or exploited. Beyond this, however, radio and television constitute a powerful channel for social forces with which we must grapple. At times their influence runs parallel with the objectives of the Christian church, at other times their objectives appear to be uncongenial or antagonistic. There are occasions when Christians, whether broadcasters, listener-viewers, or religious educators, should encourage and assist in carrying out certain policies of the media; there are other occasions when policies should be criticized and opposed."

Chapter 2 deals with some critical questions pertaining to the American system of broadcasting that should be of concern to all thinking citizens, whether churched or unchurched. To what extend do the media change, reflect and reinforce the attitudes of listener-viewers? What are the relationships of government, management and the advertisers to American broadcasting and the effects of these relationships on the kinds and quality of programs presented? Must programs always be designed to appeal to the largest possible audience? Or does the "public interest" require that minority tastes and interests be served as well?

Chapters 3 and 4 deal with program possibilities and problems and prospects for improvement. Commonly accepted standards for program evaluation are discussed, but the author stresses one criterion as fundamental to all others. "It accepts broadcasting's focus on the audience and asks of each program element, is the listener-viewer treated as man or less-than-man? Is he regarded as a man, or as a mouse to be routed through mazes? Is he a man, or a machine to be operated, a vegetable to be cultivated? Is he a man capable of growing and learning, or simply a creature able to react?"

In the light of this standard, the author proceeds to evaluate, in an honest and objective manner, some of the major types of programs which he classifies for convenience as advertising, news and entertainment. Needless to say, he finds many current programs falling far below this standard. On the other hand, he does not overlook the many good programs, whose creators have regard for human dignity and who see purpose beyond mere profits.

After an informative and succinct description of the present scope of religious broadcasting, Professor Bachman concludes his volume with a discussion of the need for a more definite plan of action on the part of the churches. But there is no one approach that will suffice. "The pursuit of a plan for the church's ministry in the world of radio-television will lead in many directions. There must be an exploration of the relationship between Christianity and the arts; there must be continuing research into purposes and programs, audiences and influences on them; utilization and discriminative analysis of broadcasts must be undertaken by groups and individuals; there must be an intensified search for standards of program evaluation, and channels must be cleared for candid exchange of views with representatives of industry and government. If there is to be

any sense of direction to this pursuit and if valuable resources are not to be dissipated in the process, there must be co-ordination of effort among as many churches as possible, locally and nationally."

Whether religiously oriented or not, every student of the mass media should read this book. It is a thoroughly scholarly work, well documented, and written by a man who has long been a close student and constructive critic of all forms of mass communication.

Walter B. Emery
Michigan State University

NAB ENGINEERING HANDBOOK. Edited by A. Prose Walker and George W. Bartlett. Fifth edition. New York: McGraw-Hill Book Company, Inc., 1960. xxv+1705 pp. $27.50.

Every broadcaster—producer, director and manager as well as engineer—should find himself referring to this new handbook regularly.

The best ways of using and planning studio facilities are described in nearly two hundred fact-loaded pages. How much light should you use in your studios, and what should the individual pieces of lighting equipment cost? How can you reduce costs by improving procedures of film-handling? How can you easily make an electronic "b-o-i-n-g" for comedy sound effects? When you build a studio what is the best way of giving it good acoustical properties at low cost? Which arrangement of performers and microphones will do full justice to reproducing music that originates in the studio? Questions like these are answered in rich detail, with data drawn from manufacturers, networks, broadcasters, and the NAB Engineering Department.

New sections on stereophonic broadcasting, video-tape recording, and automatic logging are a few of the features that have been prepared by forty-seven experts. More than a thousand photographs, diagrams, and tables lace the text. The thirty-five page index averages more than a hundred entries to the page.

Standard reference content is plentiful. Do you need to know the transmitting frequencies of the National Observatory so that you may set your studio clocks accurately? Exactly what do FCC regulations require to appear in a program log? How often should you oil film projectors in order to save them from early demise? Look to the handbook.

Because average time between new editions has been approximately six years, the present price of having this useful giant at hand is less than two cents a day. Every American broadcaster who is in a position of responsibility needs to have a copy nearby.

Kenneth Harwood
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PURPOSE OF THE ASSOCIATION FOR PROFESSIONAL BROADCASTING EDUCATION

The purpose of this organization is to secure mutual advantages that flow from a continuing relationship between broadcasters and institutions of higher learning which offer a high standard of training and guidance for those who plan to enter the profession of broadcasting.

These are the fundamental objectives of the Association:

To improve the services of broadcasting.

To facilitate exchange of information on broadcasting.

To bring together to their mutual advantage those in broadcasting and those in institutions of higher learning.

To facilitate employment at maximum effectiveness for those who meet the standards of institutions of higher learning and of broadcasting.